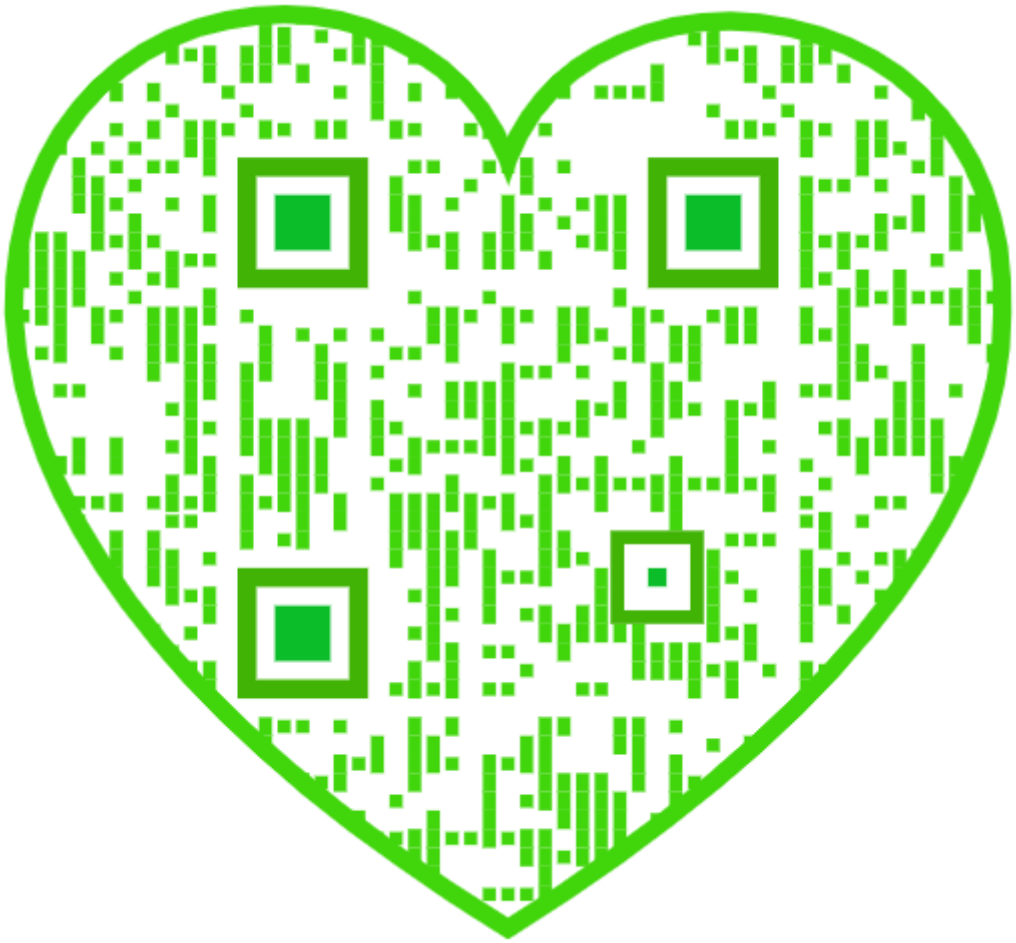

International Library of Technology

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A SERIES OF TEXTBOOKS FOR PERSONS ENGAGED IN ENGINEERING PROFESSIONS, TRADES, AND VOCATIONAL OCCUPATIONS OR FOR THOSE WHO DESIRE INFORMATION CONCERNING THEM. FULLY ILLUSTRATED

ELEMENTS OF PEN-AND-INK RENDERING
RENDERING WITH PEN AND BRUSH
ELEMENTS OF WATER-COLOR RENDERING
RENDERING IN WATER COLOR
DRAWING FROM NATURE
THE AMERICAN VIGNOLA

SCRANTON
INTERNATIONAL TEXTBOOK COMPANY
1921

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PREFACE

The volumes of the International Library of Technology are made up of Instruction Papers, or Sections, comprising the various courses of instruction for students of the International Correspondence Schools. The original manuscripts are prepared by persons thoroughly qualified both technically and by experience to write with authority, and in many cases they are regularly employed elsewhere in practical work as experts. The manuscripts are then carefully edited to make them suitable for correspondence instruction. The Instruction Papers are written clearly and in the simplest language possible, so as to make them readily understood by all students. Necessary technical expressions are clearly explained when introduced.

The great majority of our students wish to prepare themselves for advancement in their vocations or to qualify for more congenial occupations. Usually they are employed and able to devote only a few hours a day to study. Therefore every effort must be made to give them practical and accurate information in clear and concise form and to make this information include all of the essentials but none of the non-essentials. To make the text clear, illustrations are used freely. These illustrations are especially made by our own Illustrating Department in order to adapt them fully to the requirements of the text.

In the table of contents that immediately follows are given the titles of the Sections included in this volume, and under each title are listed the main topics discussed. At the end of the volume will be found a complete index, so that any subject treated can be quickly found.

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ELEMENTS OF PEN-AND-INK RENDERING

INTRODUCTION

1. The term **rendering** applies to the treatment of a drawing in light and shade. A landscape, a portrait, or a perspective of a building may be drawn in outline, but to give it full pictorial effect the lights and shades should be indicated either by flat washes of color laid with a brush, or by a series of closely placed lines drawn with a pen. The representation of light and shade by either method is termed *the rendering of the drawing*, and is entirely independent of the outlining of the drawing itself, although it is absolutely necessary that the outline should first be drawn in pencil.

Light and *shade* tend to give the semblance of reality. Objects in nature are seen as spots or masses of different colors, differing also in degree of lightness or darkness. A drawing may be rendered in color and shaded, or in color only, as is done by the Japanese, or it may be rendered in simple light and shade, a common method of which is with pen and ink. This Section will treat of rendering in light and shade only, both by means of pen and ink and by means of the brush in monochrome; that is, a wash of one color.

The successful rendering of a drawing does not depend solely on the mere ability to draw outlines. The eye and hand may easily be trained to observe outlines and to depict them on paper, but it requires a more careful observation to judge of the relative amount of light and shade on each part, especially as they always appear exaggerated when contrasted

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with one another; that is to say, a bright object will appear brighter against a dark ground than it would if surrounded with other bright objects. A deep shadow—such as the interior of a doorway—will appear deeper and less transparent if the outside of the building is in full sunshine. In rendering a drawing one must study these phenomena, and use the knowledge so gained in his work.

So, also, if two shades are contrasted, the lighter one will appear lighter and the darker one will appear darker than is really so. This happens with the drawing as well as in nature, and while it is sometimes disturbing, it is more often a serviceable means of producing desirable effects.

VALUES

2. The term **value** is employed by artists to express the degree of light or shade. In rendering a drawing we employ different values; that is to say, different degrees of light and shade, as, for instance, black, gray (or half tone), and

FIG. 1

FIG. 2

white. These three values may be used to represent simple light and shade, as in Fig. 1, where white and gray alone are used, giving a drawing in two values. Values are also used to express differences of color in the objects they represent, as shown in Fig. 2. Both considerations enter into the

proper rendering of a drawing, but the former alone is occasionally all that is required, and there is great difference of practice among artists as to the extent to which "color values" should be employed.

The simple rendering of Fig. 1 indicates that the source of light is behind the girl and to the left, thereby throwing her shadow in front and to the right, shading her face and the front portion of her dress. This two-value rendering makes no attempt to show whether the dress is light colored or dark colored, or whether the kerchief about her neck is of the same or a different color from the dress. In Fig. 2, however, the rendering shows clearly that the kerchief is lighter in color than the dress, and that the dress is lighter in color than the apron. The position of light is not indicated, as the color values give sufficient interest.

As rendering consists of the expression or representation of these values, it is obvious that a clear conception of them is of the utmost importance. The student should make for himself a scale of values, and practice on this scale frequently in order to become familiar with it.

3. Scale of Values.—A **scale of values** is a gradation from the deepest shadow to the brightest light; that is to say, a representation of all the shades from black to white. It is possible to make such a scale express so many values between absolute blackness and absolute whiteness, that the steps can scarcely be perceived; but for practical use in pen-and-ink rendering three tones or values—black, half tone, and white—will often be sufficient. This has been shown in Fig. 2, where the apron and hair are expressed in the darkest tone, the dress and water jar in the half tone, and the face, kerchief, and stockings in the white of the paper.

A scale of five values should also be practiced, however, so as to give power to depict an object more fully than can be done with three tones, but in pen-and-ink rendering a scale of more than five values is difficult to use and seldom necessary. These five values should first be rendered in a wash

drawing with the brush, as shown in Fig. 3, where (*a*) is absolute black, rendered with the full strength of the ink; (*e*) is perfectly white, being simply the color of the paper; (*c*) should be midway in tone between (*a*) and (*e*), and (*b*) should be midway in tone between (*a*) and (*c*), while (*d*) is midway between (*c*) and (*e*). This gradation of tone should be carefully practiced until the eye is satisfied that none of these middle tones leans more to one of its next neighbors than to the other; that is to say, (*b*) should be just as much darker than (*c*) as (*a*) is darker than (*b*). Having secured these tones in wash, they should be drawn with pen and ink, as shown in Fig. 4.

Fig. 3

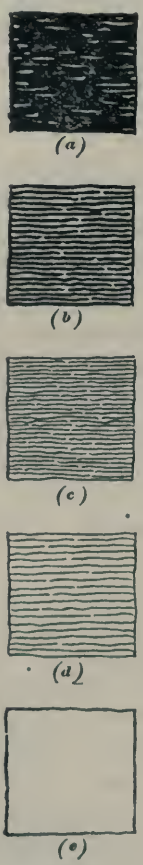


Fig. 4

In pen drawing it is seldom, if ever, advisable to use an absolute black. A flat black color, such as shown at (*a*) in Fig. 3, is within the province of brush work, but pen drawing is essentially line drawing, and even the deepest black should not lose this character. Therefore, small specks of white show through it, giving it transparency and characterizing it as pen work.

4. In preparing this exercise, Fig. 4, five squares should be drawn (about 1 inch each) and (*a*) rendered first as the deepest tone. The tone marked (*c*) should then be rendered by a series of moderately heavy lines, spaced about as

indicated, in order to give a tone which shall be about the same as (*c*) in Fig. 3. The tones (*b*) and (*d*) can then be rendered to correspond with (*b*) and (*d*) in Fig. 3. Observe that the darker tones are produced by making *heavier* lines and spacing them close together, whereas the lighter tone, as at (*d*), is produced by making *light* lines and leaving more space so that the white paper shows through and tempers it. The half tone (*c*) is the key to the entire scale, as it must be midway between (*a*) and (*e*). Drawings are usually rendered in such tones as (*a*), (*c*), and (*e*) first, after which the tones (*b*) and (*d*) are introduced, if necessary.

This practice of scales of values should be repeated frequently on separate pieces of paper, both with the brush and with the pen. The intermediate values (*b*), (*c*), and (*d*) should always be made separately and then compared with (*a*) and (*e*) or (*c*) and (*e*), as the case may be, to see that they are in equal contrast to the values between which they are to be placed. Any inequalities should then be corrected by making a new wash, and the experiment repeated until the exact tone can be attained the first time. When the eye moves easily and comfortably from one value to the next, we have a rhythmic progression of values. This rhythmic progression, or movement, by regular steps of value from light to dark or from dark to light, is one of the most important factors in the agreeable rendering of a drawing.

It is evident that the same value may be obtained either by using fine lines set near together, or fewer or heavier lines set farther apart. The amounts of black and white will be the same in both cases, and the values identical, but the effect will be different. This difference is called *difference of technique*. It is analogous to the difference produced in cloths of the same color by different methods of weaving. A coarser or finer technique in the shading is often employed to represent different colors of the same value. A difference of technique may be produced also by giving the lines different directions, or by crossing them, which is called *hatching*.

5. As said before, in the expression of a tone by means of the pen the value is attained by the grouping of the lines. The depth or darkness of the tone will depend on the weight, or width of the lines, or the distance at which they are placed from each other, as shown in Fig. 4. In other words, each line drawn is a black line, and the effect of value results from the amount of white paper remaining uncovered by the ink. The dark value may be produced by a multitude of fine lines drawn closely together, and this is almost invariably the tendency of the beginner. A much better effect, however, results from a more economical method of working, as that shown in Fig. 4 (*a*), where the darkest value is composed of heavy lines closely spaced and recrossing one another at an acute angle. Another tendency of the beginner is to express the lighter values with very thin, weak lines; this is not only bad practice, but it renders the drawing difficult to reproduce as an illustration. All lines in a good pen drawing must be firmly rendered, and each must be black and full width. Therefore, a light value is best expressed with firm lines drawn a good distance apart, as shown at Fig. 4 (*d*).

It is well for the student to know that even experienced artists find it necessary to practice these scales of tone before they start to render a drawing. It takes some little time to limber up the fingers so that the pen can be handled smoothly and satisfactorily, and 15 minutes a day devoted to this simple work will do more toward the training of the hand than hours of practice in actually rendering an illustration. In like manner, the most renowned pianists have to practice their scales every day.

COMPOSITION

6. **Composition** in a drawing is the grouping of the various parts that make it a picture. Each important detail must be grouped in such relation to every other detail as to produce the most pleasing effect. An illustration or a drawing in which the principal objects are scattered all over it,

is not interesting. They must be so grouped that the eye either takes them all in at a glance and realizes that all other objects in the picture are merely accessory, or they must be grouped so that the eye travels naturally from one to the other and easily comprehends their relations.

In sketching from nature or taking a photograph, one must first choose a point of view and then decide just what part and how much of the subject before him should be included in the picture. In photographic work this is not always an easy matter, and photographs taken for the purpose of illustration frequently require alteration or change of composition by the artist.

In practical pen work, it frequently happens that the draftsman receives a subject to render, in the form of a photograph from nature or a perspective in outline of some building. Here, so far as concerns effects of light and shade, the matter of composition is left entirely with him, and he must determine on the different values in which he will render the different parts, and he must use his own judgment for the introduction of such accessories as figures and foliage that may be required. The success of his rendered drawing will depend more on the skill he has shown in this composition, than on his technique or skill in the handling of the lines themselves.

BALANCE, RHYTHM, AND HARMONY

7. It is necessary to understand and keep before the mind the fundamental principles of composition; i. e., to notice and remember what arrangements are the most agreeable. These principles apply not only to pictorial representation, but to every kind of design. In general, composition involves three separate considerations—*balance*, *rhythm*, and *harmony;* and if work be executed in accordance with these principles it will result in a unity of effect that is satisfactory and restful, because all parts of the picture are consistently related to one another. They should be thoroughly understood and constantly remembered, for

they apply not only to pictorial representations but to every kind of design.

8. Balance.—A composition in which the attention is too much scattered lacks interest, and it should be so arranged as to direct the eye toward the most important object. But this object should not be too far from the middle of the picture, or the composition will look ill-arranged and one-sided. Hence, if the picture contains but a single object of interest, it should be set somewhere near the middle, while several objects of nearly equal importance should be put at about equal distances from the center. Several objects of various degrees of importance are naturally placed at different distances, accordingly.

In respect of light and shade the important thing is value. In a composition of lights, white objects are of the most

FIG. 5

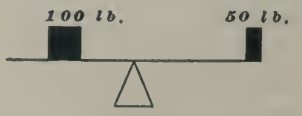


FIG. 6

importance; in a composition of darks, black objects are of the most importance. This is illustrated by the two principal pictures in Mr. Abbey's paintings of the Holy Grail, in the Boston Public Library. In one of them the white draperies are concentrated at the middle of the picture, with the colored costumes on either side, growing darker toward the edges. In the other, the center of the canvas is occupied by a funeral pall, and the colors grow brighter right and left.

But this is just the way in which, in mechanics, bodies of different size and weight balance one another around their center of gravity. The largest and heaviest are nearest to it, the smaller and the lighter at greater distances accordingly. Hence, a composition thus arranged is, by analogy, said to be **balanced**.

Balance is a principle that every one understands as a physical law. We all know that when a board is balanced evenly over a sawhorse, as in a seesaw, its center must be

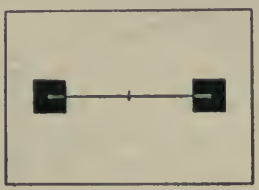
over the center of support. We also know that if a weight be placed on one end of the board the balance can be maintained only by placing an equal weight on the other end, as shown in Fig. 5. A weight of 100 pounds placed half way between the end of the board and the point of support, can be balanced by a weight of 50 pounds placed

(a)

(b)

(c)

Fig. 7



(a)

(b)

Fig. 8

on the extreme other end, as shown in Fig. 6. In Fig. 7 are shown three rectangles, in the center of each of which is a spot. These spots are of different shapes, but the balance is

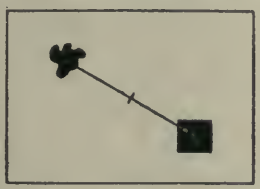


Fig. 9

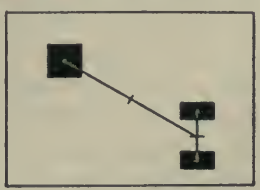


Fig. 10

maintained by their central location in the figure. In Fig. 8 are shown two spots similar to that shown in Fig. 7 (*a*). They are the same size and shape and are spaced equidistant

from the center; they therefore balance each other in the composition. In Fig. 9 the spots are of different shapes, but are of equal value in light and shade; therefore, being equidistant from the center, they balance. In Fig. 10 are shown three spots, two of which are each half the size of the third; these two, being together equal in value to the third one, satisfactorily balance with it when spaced the same distance from the center of the picture, as shown. It is therefore evident that a close relationship exists between the balancing of weights in mechanics and the balancing of values in art.

9. The balance of values in pen-and-ink drawing is thus subject to laws similar to those governing the balance of actual weights. The center of the paper on which our picture is drawn corresponds to the center of gravity under our weights, and by a few experiments in the placing of

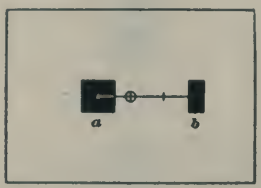


FIG. 11

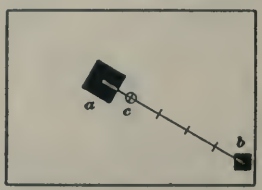


FIG. 12

unequal spots so that they will balance within a rectangle, we can see the operation of these laws of composition. In Fig. 11, the spot *a* is twice the size of the spot *b*, but is placed one-half the distance from the center that *b* is placed. Therefore, *a* and *b* are balanced as they would be in mechanics. In Fig. 12 the spot *a* is four times the size of the spot *b*, but these two are balanced because the distance *a c* is only one-fourth of the distance *b c*. Just as the difference in the weight of two bodies depends partly on their size and partly on the weight of the material composing them, so the difference in the importance of two spots is not determined solely on their relative sizes, but also on their relative light-and-shade values. This is as shown in Fig. 13, where the spot *a* is twice the size of spot *b* but its light-and-shade value

is only half as strong as *b*, and therefore these two are balanced when equidistant from the center *c*, because *a*, being half as strong, is twice the size of *b*, and therefore equal in value. In Fig. 14 the lighter value *a* is balanced by the dark value *b*, although the latter is but one-fourth the size of *a*. Being one-fourth the size and twice the strength in color, it has half the value of *a* and balances with *a* when placed from *c* a distance twice as great as *a* is placed.

10. Balance in composition consists of the proper grouping of the masses of light and shade so that the eye is directed toward a central point.

In order to appreciate this the student should make for himself several problems in the balancing of spots, working first with squares and rectangles and calculating and measuring them accurately. Irregular spots should then be taken,

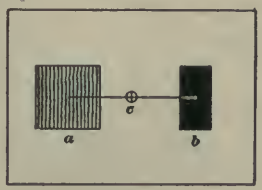


FIG. 13

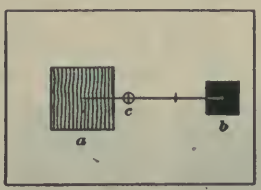


FIG. 14

and finally natural objects should be grouped in order to get their light-and-shade values properly balanced within a given rectangle. If, on looking at his drawing, the student feels that there is more weight, so to speak, on one side than on another, the balance can be restored by deepening the color or shadow or by increasing its area. This principle of balance must be considered carefully in all work of the pen draftsman. Study the work of prominent illustrators with these principles in mind and observe whether the values distribute themselves properly so that the eye is held to the center of the drawing.

The best effects are obtained usually when a drawing has its principal dark spot brought into balance by a smaller dark spot combined with a proper amount of other values.

It is not necessary that the center of balance be exactly in the center of the picture. It is usually near the center, however, and is only removed therefrom to produce some special purpose. In general pictorial composition the balancing of equal masses is not satisfactory, as it is likely to introduce an appearance of doubleness to the picture; that is to say, the two equal masses will divide the interest instead of uniting it, in one general effect. Therefore, the important mass or center of attraction in the picture should be made most prominent, and the minor masses rendered in values that will properly balance it without competing with it in importance.

In decorative composition, however, a symmetrical arrangement of one mass equally balancing the other mass is frequently employed and is one of the most useful elements in this line of work.

11. Rhythm, applied to composition, is an orderly movement from form to form, from line to line, or from value to value. The even gradation from black to white, as shown in Figs. 3 and 4, is a rhythm of values. It is an even progression that is smooth and satisfactory, giving a feeling of restfulness. In Fig. 15, the contrast between (*b*) and (*c*) is so much greater than between (*b*) and (*a*) that there is no rhythm. There is also no rhythm in Fig. 16, for the jump from (*a*) to (*b*) is greater than from (*b*) to (*c*); in other words, (*b*) is much lighter than (*a*) though (*c*) is not much lighter than (*b*). But there is a rhythm of values in Fig. 17, for (*a*), (*b*), and (*c*) progress evenly in tone

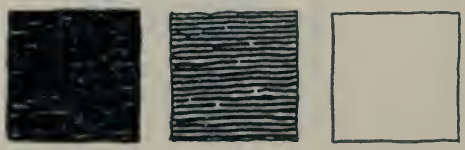


Fig. 15

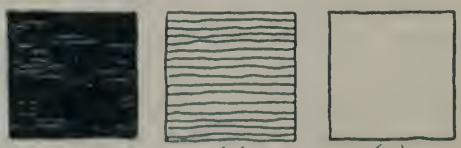


Fig. 16

from one to the other, and the step from (*a*) to (*b*) is practically the same as the step from (*b*) to (*c*).

Comparing these values with those in Fig. 4, it will be seen that the jump from (*b*) to (*c*), Fig. 15, is practically the same as the jump from (*b*) to (*e*), Fig. 4, while in Fig. 16 the jump from (*a*) to (*b*) is practically the same as the jump from (*a*) to (*d*), Fig. 4; but in Fig. 17, the values (*a*), (*b*), and (*c*) correspond to the values (*a*), (*c*), and (*e*), Fig. 4, and are therefore rhythmic. The use of values in Fig. 17 would, as a rule, give a more satisfactory rendering of a drawing than the use of unrelated values in Figs. 15 and 16, although there are occasions where these great contrasts may be required.

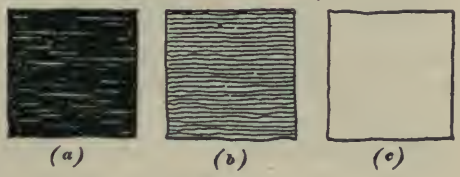


FIG. 17

12. Rhythm of line in pen drawing is an orderly movement or progression from line to line. For instance, observe in Fig. 18 (*a*) how one line leads gracefully and evenly to

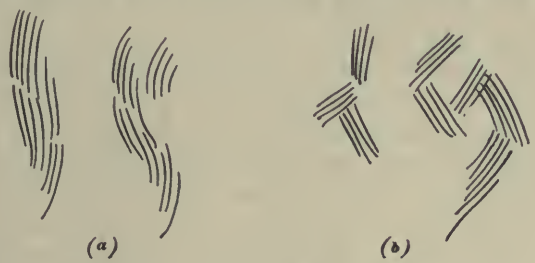


FIG. 18

another line, and the eye follows from one to the other without interruption or break; but at (*b*) the lines are broken and antagonistic, and give a feeling of unrest. The lines at (*a*) are rhythmic; the lines at (*b*) are not. There are occasions where the form of shading shown at (*b*) is necessary and useful, particularly where the rough, uneven surface is required, the very feeling of the antagonism

and contrast of the lines producing the feeling of roughness of surface that is intended. As a rule, however, the form of rendering shown in Fig. 18 (*a*) is more pleasing and more suitable.

13. Harmony in composition arises from a consistency in the character of the lines and tones. The term harmony is more frequently used in connection with color work, but it may be used in pen rendering as well to signify in the choice of the lines that are used for the representation of different objects. In a successful drawing there is always a similarity in character in all the lines used. They may, and usually should, vary in strength and in lesser characteristics, but they should all have something in common.

Compare the drawing by Gibson, Fig. 44, with that by New, Fig. 55. It is clear that there is a great difference of handling here. In the Gibson drawing all the lines are brisk, strong, and nervous—evidently quickly drawn; but in the drawing by New there is no evidence of rapidity of execution, and the lines exhibit a slowness of stroke that is characteristic of this artist's work. Compare, also, the long, sinuous lines of Beardsley, Fig. 49, and Bradley, Fig. 58, with the short strokes used by Vierge, Fig. 33. Each of these men has a *line* characteristic of himself; and all lines in any of these drawings are uniform in character. This gives a harmony that stamps the drawing as clearly the work of its individual artist, as does the signature of the artist beneath it.

The tendency of the beginner is to use lines of varying and uncertain character in his drawing. This is to be expected at first and should cause the student no discouragement, for harmony of line can only be achieved after much practice with the right principles constantly before the mind. Constant work will bring the student into a path that will be as much his own as his manner of speaking or walking.

The student should always study the work of good pen artists—not to copy it, but to learn from it the method of expression. No two are exactly alike, and yet all illustrate

the same principles. The student's own individual way, if properly worked up, will always be best suited to his tastes, and there is no more reason why he should imitate one man's way of working than he should imitate his way of walking or writing. No two men write exactly alike, and it seldom happens that one man tries to imitate another man's style, either of language or of handwriting. After much practice, without giving much thought to the appearance of the writing so long as it is legible, a man falls into a system of his own which can be recognized by his friends, or identified by a stranger. It is the same with drawing. The student should study principles, and not methods. His own methods will soon take form and will give character to his work. Nevertheless, it is a useful exercise occasionally to copy a drawing in facsimile.

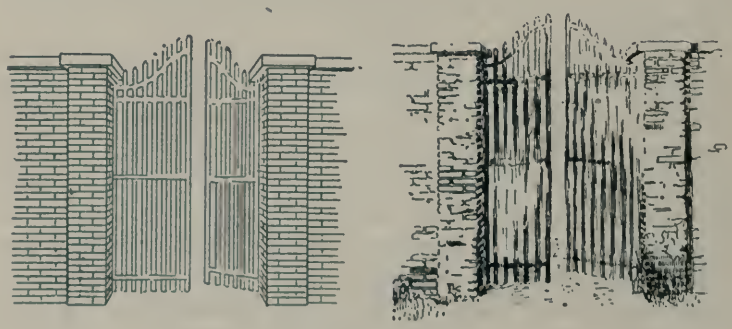
TEXTURES

14. An important element in the consideration of all drawing is the question of light and shade on the object, and the character of line with which it is rendered. One must be made to feel the material of which every part of the depicted object is composed the moment he looks on a drawing. A shingle roof must be rendered in such a manner that it expresses shingles, without drawing individually a single shingle upon it. A brick wall should be specific of regularly coursed bricks, without any attempt to lay out those bricks in hard outlines. Heavy draperies should express themselves by the weight of their folds, and light draperies should show their *texture* by the method of their rendering.

By **texture**, in rendering, is meant the expression of the particular quality that characterizes any material represented. It is a very broad term and is frequently used, as it is very essential to suggest in a satisfactory manner the difference in material of parts of a study. It is very important in illustrating that texture be shown, but it can be very easily overdone. It should be suggested rather than expressed.

A plain brick wall ruled off to show all the joints in

the brickwork, as in Fig. 19 (*a*), would make a very monotonous and uninteresting drawing, inasmuch as in our illustration we are not particularly concerned in the masonry of this construction but only in its pictorial value. Properly rendered, a brick wall can be made to show its texture without an expression of more than a few bricks in its entire surface, as in Fig. 19 (*b*), and even at times without the direct indication of any bricks at all. On the other hand, much life can be given to an illustration by the careful rendering of these simple textures, as may be seen in the illustration by Herbert Railton, Fig. 40. This artist's drawings show his tendency to work up the details of texture rather more minutely than can be generally



(*a*) (*b*)

FIG. 19

recommended, as much skill is required in order to prevent such close working from destroying the general interest in the composition.

Observe on the left-hand wall in this illustration the occasional suggestion of coursed brickwork, with broad, gray spaces that may represent plaster and contrast strongly with the sunlit portions of the building on the end of the alley and wall opposite. The roof on the distant building shows by its irregular outline the dilapidated condition of the structure, as also does the dip in the square opening underneath. All of these details go toward telling a story of age and decay that are rapidly affecting these architectural

details, and in telling this story they tend entirely to the expression of texture in the material.

In Fig. 41 we have an illustration by the same artist where the broad expanses of wall and chimney, through which the timber construction occasionally shows, easily conveys the impression of its plaster texture. The work below and in the neighboring walls and chimney tells a story of coursed brickwork, and does not interfere in any way with the composition of the picture by giving too much importance to the elements of this architectural construction. Another illustration by this artist is shown in Fig. 41, where the stonework in the Gothic edifice forming the center of interest is simply indicated by means of a few shadows cast at the joints. The bricks of the distant chimneys and texture of the side walls of the adjacent building are clearly indicated without in any way becoming obtrusive in the composition.

EXAMPLES OF WORK

15. D. A. Gregg.—Among the architectural draftsmen D. A. Gregg stands unexcelled in straightforward and thoroughly understood architectural rendering. Observe in his view at Vire, Fig. 20, how the texture of each surface is clearly indicated by a series of well-placed lines, and yet the entire rendering possesses even tones free from obtrusive spots or contrasts. Observe how the shades are connected so that one leads easily to another. The methods of producing these effects are worthy of study. Note that most of the shadows are rendered by vertical lines, and that in the shadows of the projections of the tower, the lines of the stonework are simply emphasized to give the effect. It is interesting to see how the tower is emphasized by making it the largest dark mass of the picture, and also by giving explicit attention to its details.

Quite different in the method of rendering is his drawing of the Chateau of Martainville, Fig. 21, where horizontal lines are used, giving the impression of a brick wall with stone trimmings in place of the stonework shown in Fig. 20.

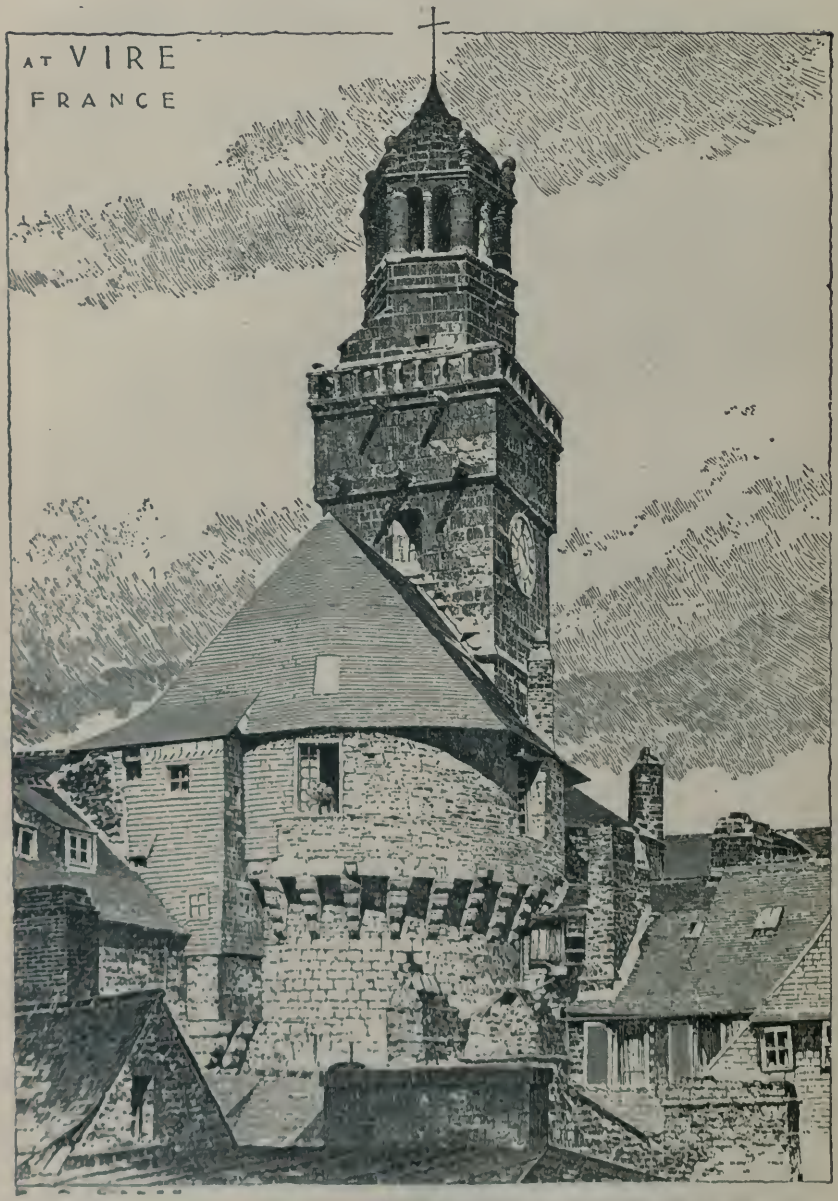


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FIG. 20

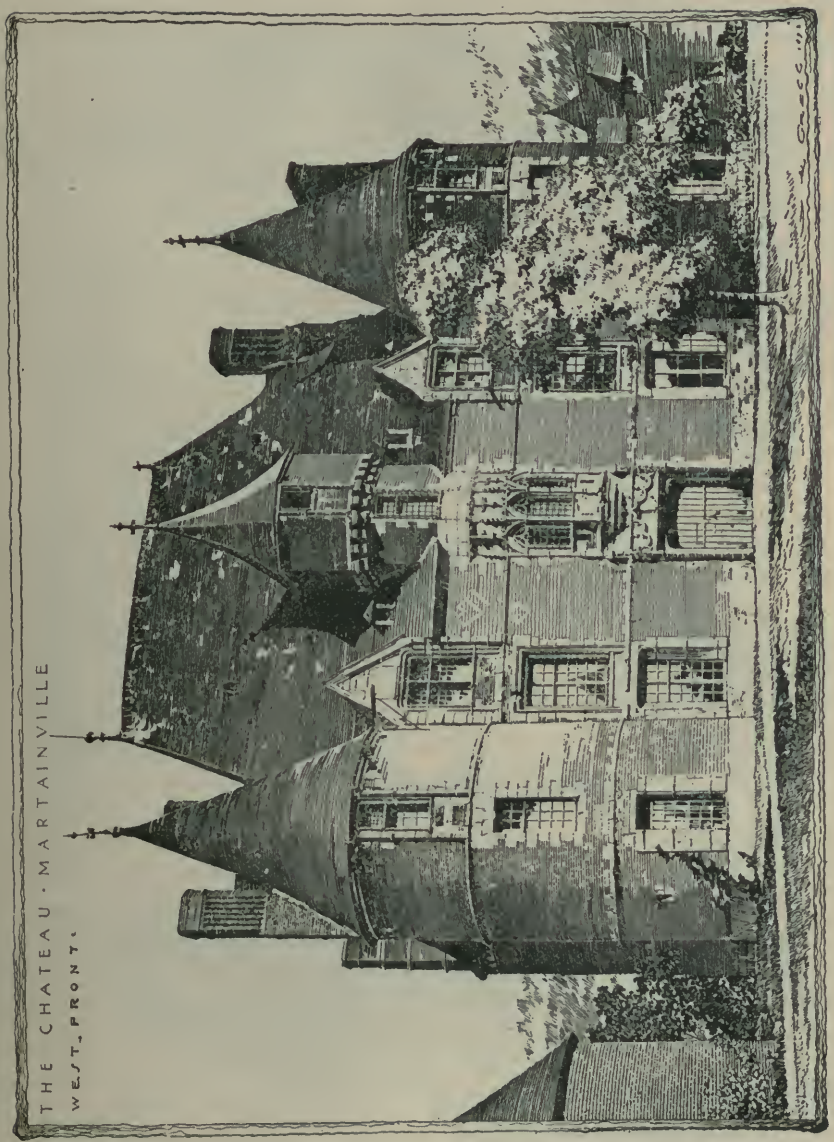

FIG. 21 *By permission of The American Architect and Building News*

This direct rendering gives a transparency to the shadows and an atmospheric effect to Mr. Gregg's drawing that is strongly characteristic of all his work.

In Fig. 22 the interior of a church is shown, on the left side of which the details of the piers are indicated simply by a few well-placed shadows that give a feeling of a flood of sunlight. Note how the pews are simply indicated by a break in the shade lines marking the backs of the seats. The fan vaulting overhead makes itself felt rather than seen. Notice also how the shadows under the arches on the left side are deeper by contrast with a bright light than they are on the right, and that although they appear nearly black the element of pen rendering is apparent in them, as a certain amount of white space remains uncovered. This black spot on the extreme left *balances* the middle tone from the center to the extreme right. It should be noted that Mr. Gregg is always exact and firm in his drawing although he so sparingly employs outlines. Although the suggestions of detail are often slight, they are precise. This is important for the student to realize, for the work of the tyro is apt to become careless rather than suggestive in his efforts to produce a free drawing.

16. Bertram G. Goodhue, another architectural draftsman whose work should be carefully studied, characterizes his renderings by a careful drawing of details and due consideration of broad effects of light and shade. The Somerville church, shown in Fig. 23, shows freedom and refinement of handling and a bright sunny effect that is delightful to the eye and serves to present the architectural design to advantage. The textures illustrated here are worthy of study, as is also the sparing use of cross-hatching. There are places where Goodhue has found cross-hatching a convenient and direct method of accomplishing certain purposes, but it is never introduced except where required.

It must be remembered that this drawing (like all of these illustrations) is much reduced from the original size and that the pen lines appear very much finer and closer

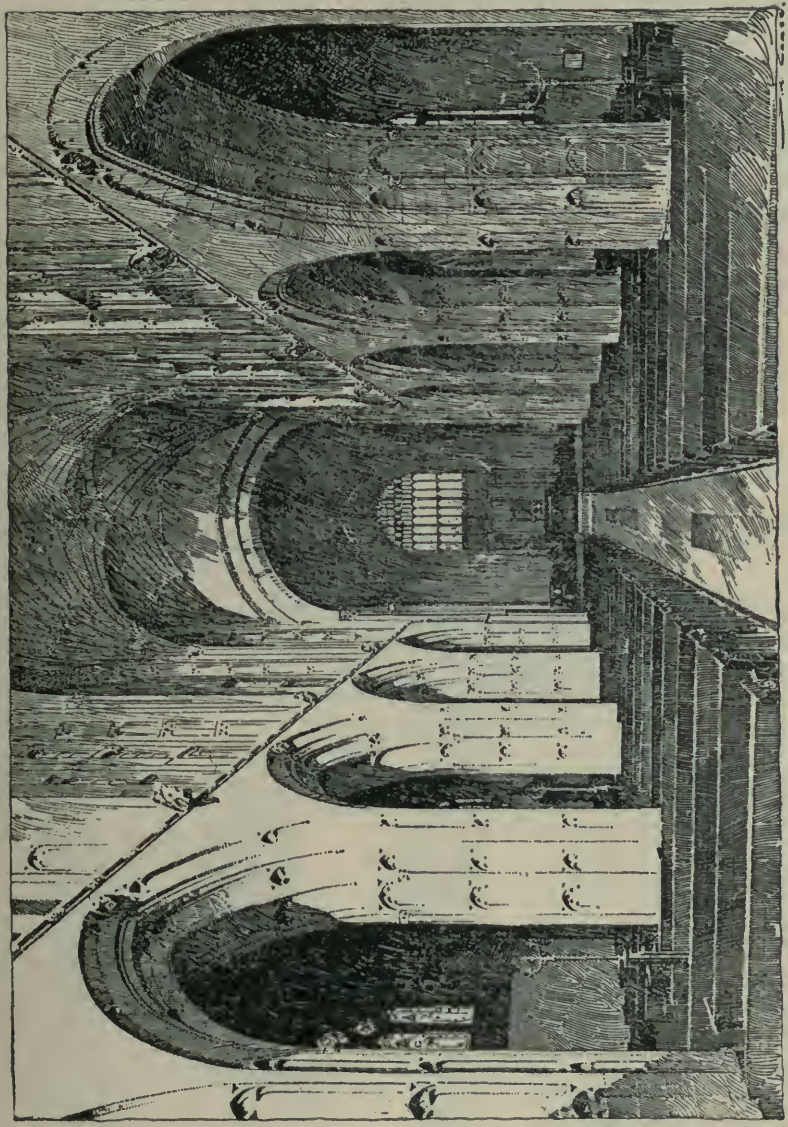

FIG. 2. *By permission of The American Architect and Building News*

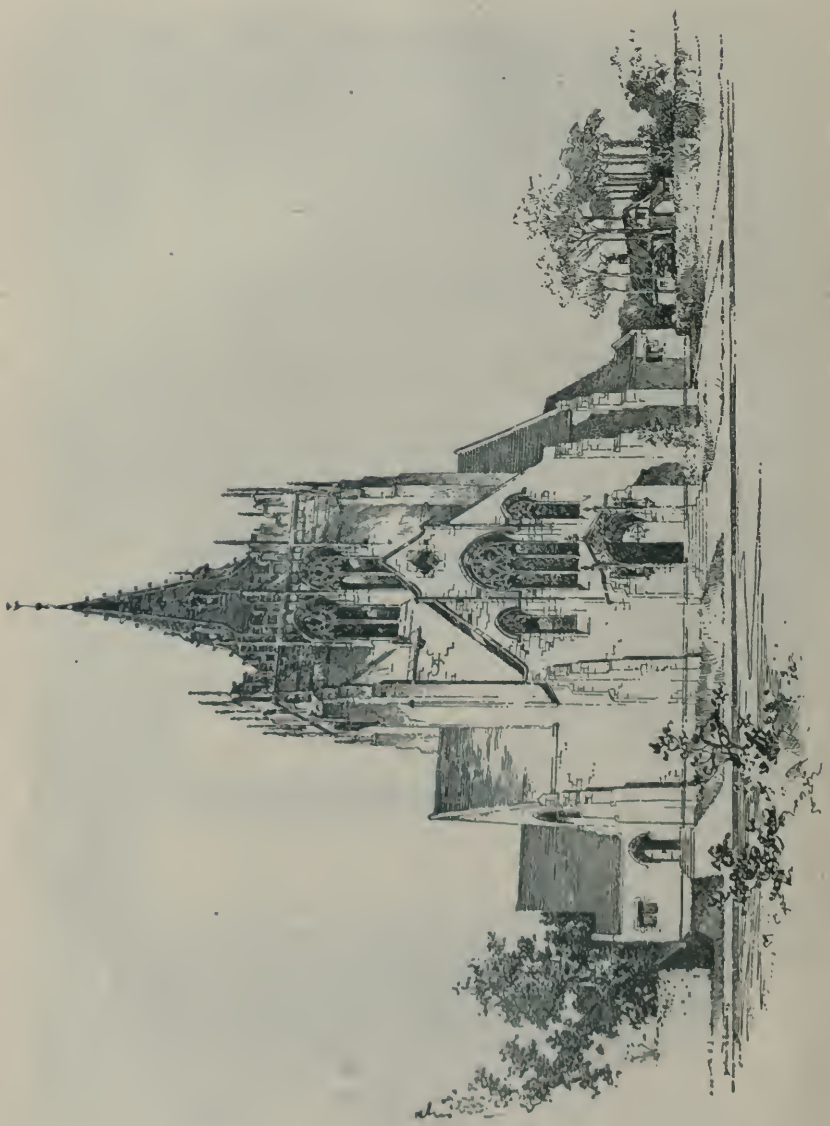

FIG. 23 *By permission of Messrs. Cram, Wentworth, & Goodhue*

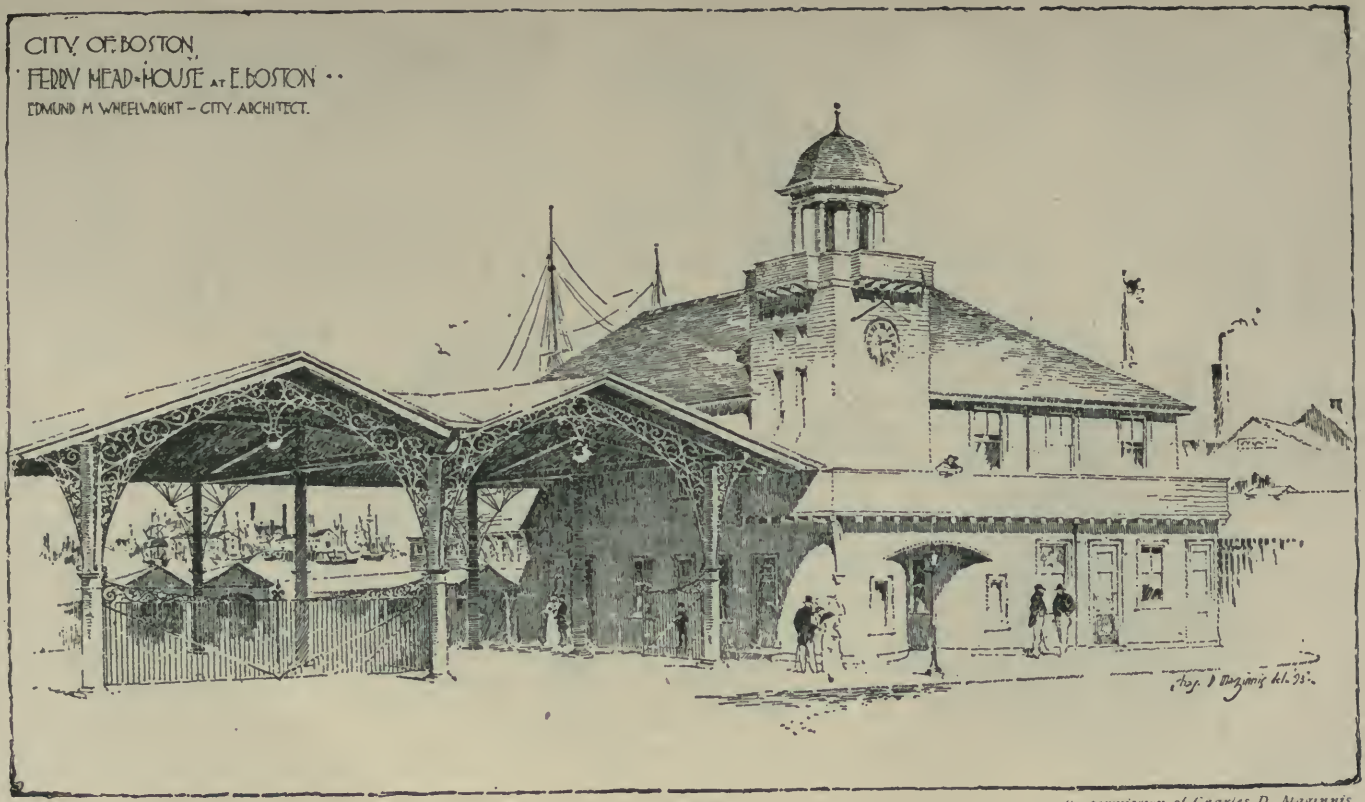

FIG. 24

By permission of Charles D. Maginnis

together than they were drawn, although of course they remain in the proper proportion to the size of the drawing. Goodhue, however, uses his lines in a somewhat closer manner than Gregg. A comparison of the styles of these two men is interesting. Compare the methods of handling foliage employed by each.

17. Charles D. Maginnis is another architectural draftsman whose work it is well to study in comparison with the style of Gregg, for there are many points in common, yet the work of Maginnis possesses strongly individual characteristics. There is a delicacy and lightness of touch that will quickly be noted. Fig. 24 shows his rendering of Wheelwright's design for the city ferry house at East Boston. Here the full sunlight of the front of the building and the cool shadow under the shed are pleasingly contrasted, while the ornamental ironwork profiled against the latter is also pleasingly expressed. Sketching here does not degenerate into carelessness, and though all the details may be free and light there is an ever-present feeling of painstaking care throughout the entire composition.

The rendering of the schoolhouse shown in Fig. 25 is also worthy of study on account of the expression given to all the details and the texture. Observe how the detailing of the bricks in the gate posts prevent these posts from confusing themselves with the shade on the lower part of the building, and that throughout the whole drawing there is a simplicity of line that adds greatly to the beauty of the work. There is no cross-hatching here, and while the building is drawn almost entirely with horizontal lines the foliage and distance is expressed almost entirely with diagonal lines. It would be difficult to find an example of pen work wherein the simplicity of line rendering is carried out more beautifully than this.

A point to be noted in these two drawings is the roof treatments. In each the central light of the composition is carried into the roof. This helps to give a very sunny

FIG. 25

By permission of Charles D. Maginnis

effect to the drawings, though in the hands of a draftsman less clever than Maginnis so much white might easily make the rendering ghostly or weak.

18. Frank A. Hays.—Fig. 26 is a rendering of the old Arnold mansion, by Frank A. Hays, that is well worthy of study on account of the delicate and sketchy handling. Sketchy as it may appear, the student must bear in mind that it must originally have been drawn out carefully in order that the few lines with which it is rendered could be properly placed. The introduction of the vine climbing up the corners of the house is very pleasing and is simply rendered.

The study of the foliage by different pen artists is interesting and instructive, as each finds a way for himself to convey the idea. The sketchy treatment here gives the impression of an old mansion. It would not be an appropriate thing to transfer this handling to the rendering of a new house, though that mistake is sometimes made by architectural draftsmen in their anxiety to produce picturesqueness.

19. Harry Fenn.—The work of Harry Fenn is very interesting, as it possesses a directness of method worthy of study. The student should be careful, however, not to attempt to follow the work of this artist too closely, or he will be likely to fall into the same dangers as were pointed out in connection with the work of Railton. It requires the greatest skill to work architectural detail up as closely as is done in these examples, without carrying it too far. Careful study of Fig. 27 will show how large a variety of methods of handling have been employed to bring out the various textures. Compare the briskly drawn lines of the ceiling with the shorter, heavier lines of the carpet, which so well suggest its surface. It is interesting to note the spatter work used to express the brickwork of the fireplace. The character of the bricks in the fireplace is well preserved without making them too prominent in the composition. The polished surface of the table is indicated by a few lines

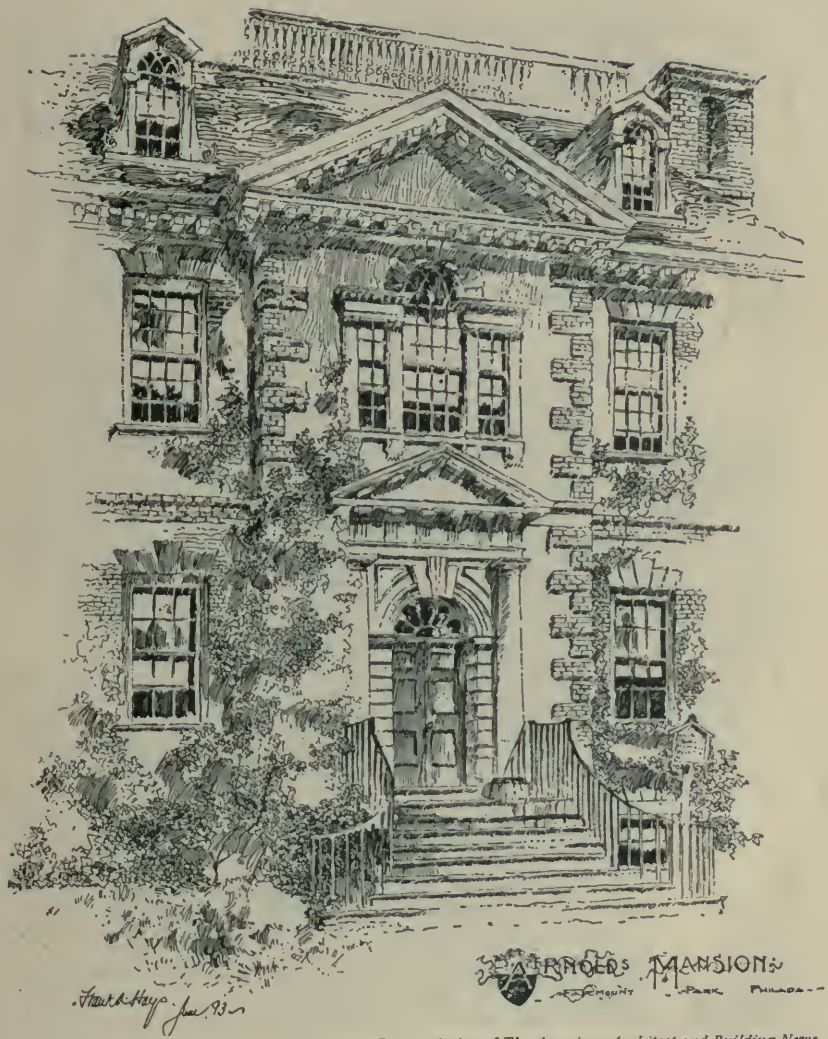

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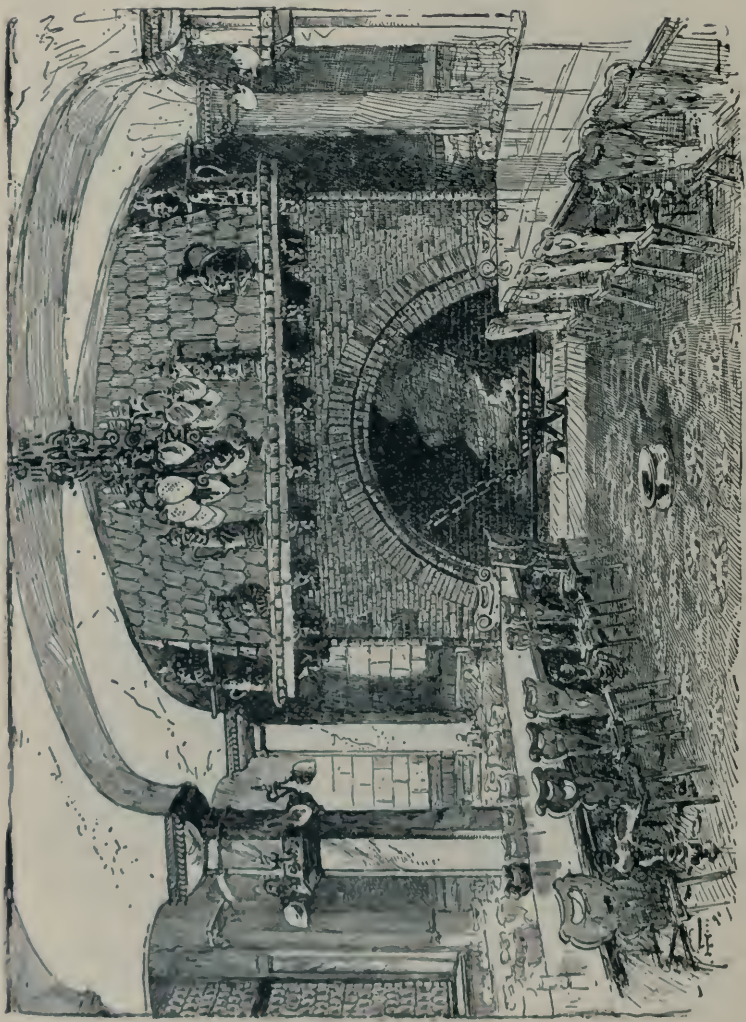
FIG. 26



By permission of The Century Company

FIG. 27

FIG. 28 *By permission of The Century Company*

showing the reflections of surrounding objects. All that has been necessary to convey the proper idea is the simple suggestion of the characteristics of the material represented, as the human mind is so subtle that it will grasp the full idea from the merest indications.

Cross-hatching is skilfully employed in the shadows of the farther walls. The snappy little touches of black throughout the drawing are thoroughly characteristic of Mr. Fenn's work. Note the grouping of the shadows in Fig. 28, and the introduction of the bird in the foreground, the masses being grouped so as to hold the interest to the center of the picture and give distance to the composition.

The lower part of the building is suggestive of stonework, while the upper part indicates its texture simply by the character of its architectural details. The stone wall in front of the building is of no importance in the composition except to introduce a dark mass in the center and to assist in giving distance or perspective to the building; yet, the texture of this wall is clearly indicated by means of a few simple lines showing the courses of stone.

20. W. Campbell.—An example of a central dark spot balanced by masses of half tone on either side is shown in Fig. 29, in the work of Mr. Campbell on the Palais de Justice in France. The student should observe the textures in the roof and side walls, the brickwork on the right arranged in geometrical forms, and the panels of brickwork on the pavilion directly in front of the eye. Note, too, how the foliage is massed in order to produce the dark spot under the roof, as before suggested, and how the tones lead rhythmatically from one to the other and establish a satisfactory unity in the composition. The little patch of sky effect is well introduced; it helps to round up the composition. It is instructive to study the means Campbell has employed in drawing the iron fence with reality of effect and variety of handling.

Fig. 30 is a piece of work by Campbell that is interesting to compare with the photograph, Fig. 31, from which

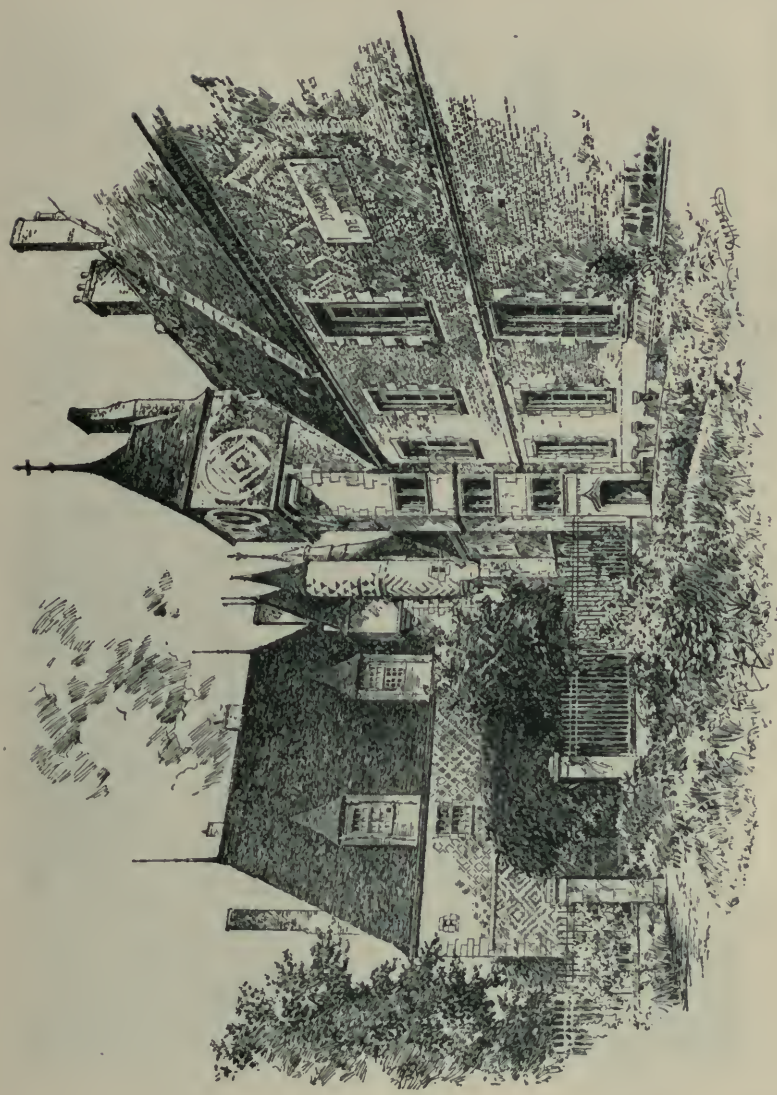


FIG. 29 *By permission of The American Architect and Building News*

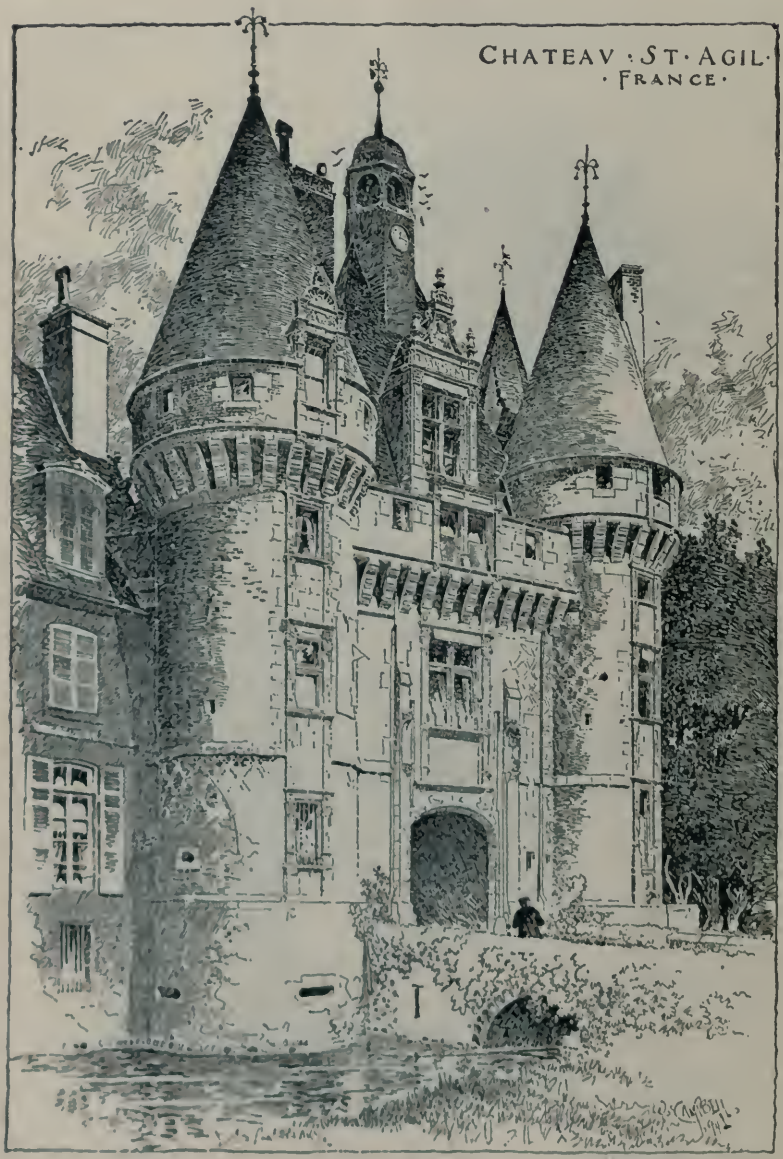


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FIG. 30

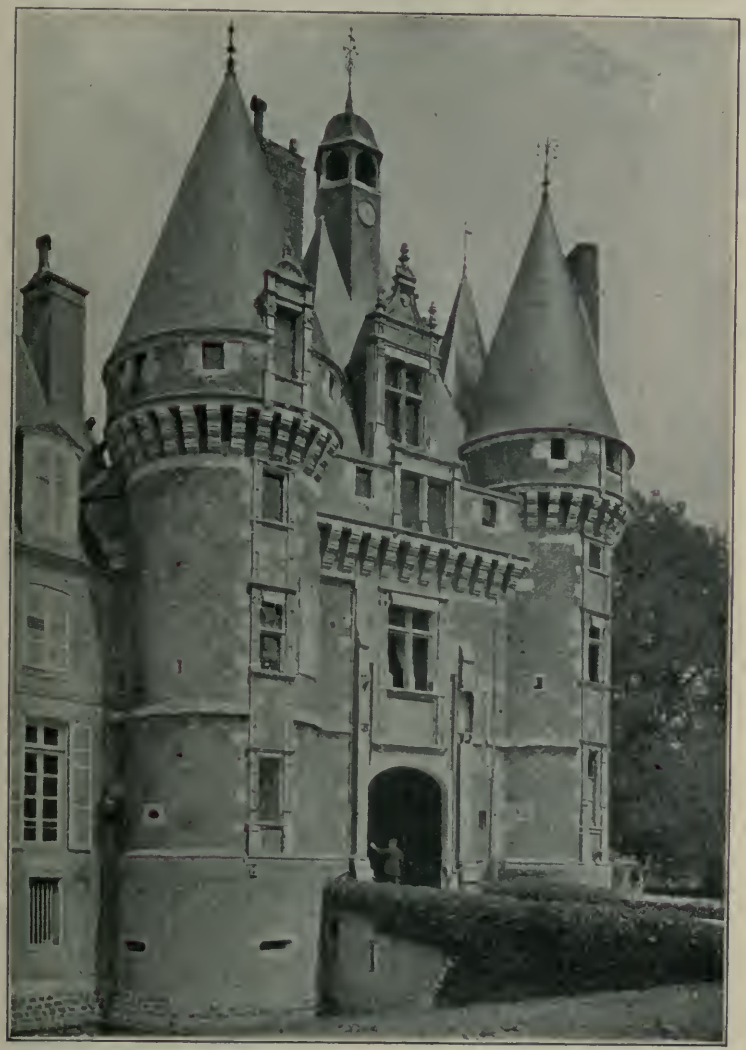

FIG. 31

it was probably drawn. The texture given the roof in comparison with that given the side walls is of particular interest, and the figure that in the photograph shows in the doorway is moved out on to the bridge in order to form a spot of black nearer the shade of the arched opening beneath the bridge. In the photograph, it will be observed that the vine on the bridge and the opening in the arch under the bridge form, with the mass of trees in the background, a large dark spot on the right side of the picture. In the rendering, Campbell has eliminated the dark effect of the vine, reduced the effect of the shadow under the entrance door, and balanced the shadows of the building in such a manner that the pen rendering is a much more pleasing composition than the photograph.

21. Ernst Peixotto.—The drawing shown in Fig. 32, by Ernst Peixotto, is a good example of balance in a composition. Note how the artist has drawn the figures and vehicles in the left-hand corner of the picture simply in outline, while those in the center are massed in deep shadow, thus making one spot dark in the center of the composition balanced on either side by masses of light and half tone. In this way the eye is led up to the principal feature which the drawing illustrates—that of the new building on the right side.

22. Daniel Vierge is properly considered one of the greatest of pen draftsmen; his drawings had much to do with forming the modern style of pen drawing. His work is masterly; his compositions dramatic; and his drawings full of character; and, technically, he has no superior. His methods are the simplest and his results are full of exquisite refinement. Oftentimes he uses, besides outline, only half tone and small spots of black. Observe in Fig. 33 the excellence of his drawing and the clean and direct use of the pen throughout his work. His methods are commended to the student for emulation, for to arrive at such results as those attained by Vierge requires nothing short of genius.

23. Martin Rico is a Spanish artist whose methods have taught a valuable lesson to scores of students. He is

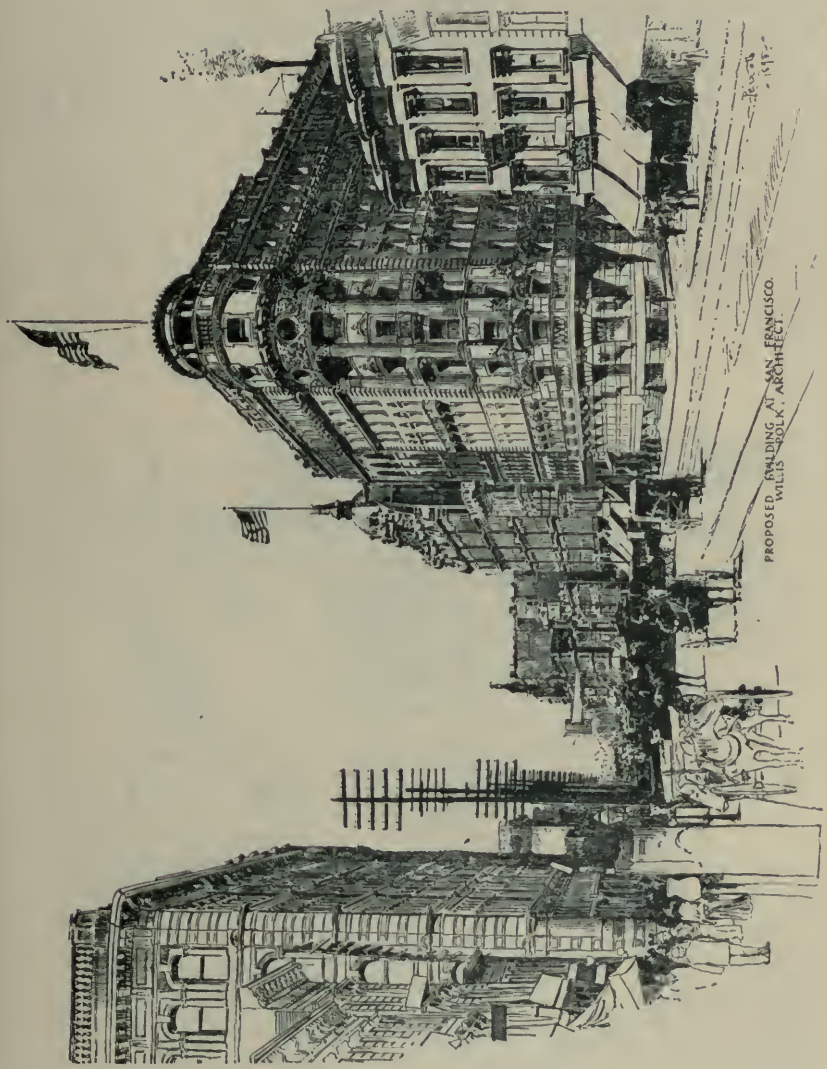

FIG. 32 *By permission of The American Architect and Building News*

Pablo de Ségovie

FIG. 33 DANIEL VIERGE

noted for his ability to indicate textures and preserve the transparency of his shadows so as to show the texture of objects, even in shadow. His renderings of Venetian subjects in full sunlight are brilliant in the extreme. His use of line is more sketchy than that of Vierge, but it is in its way most admirable. Note the sunny feeling in Fig. 34, and the contrasts of the light and shade. Fig. 35 is characteristic of his work and shows a Venetian byway wherein the deep shadows are strongly suggestive of a full and brilliant play of sunshine that makes one feel the climate and

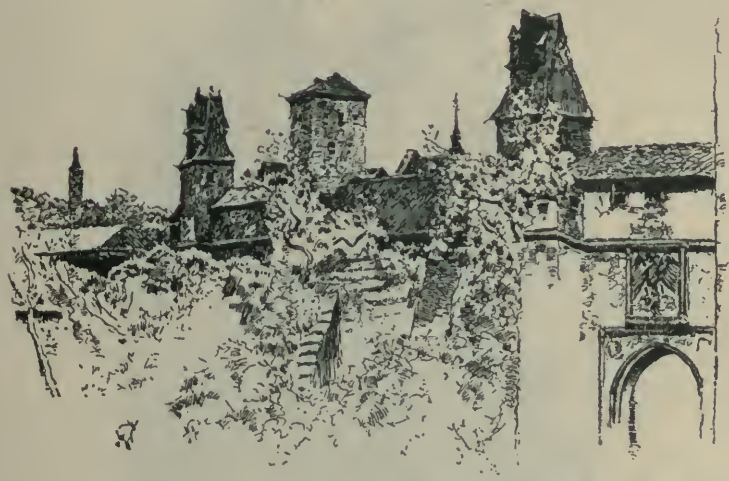

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FIG. 34

the atmosphere. It will be noted, however, that the flowers in the pots on the balconies under the windows and the foliage extending above the wall in the distance are indicated with the fewest possible number of lines, and suggested in such a subtle manner that one feels their presence without really looking for them or knowing that they are actually drawn there.

In Fig. 36, by the same artist, but one side of the street is shown, although the deep shadow indicates that buildings on the opposite side cut off the brilliant sunlight that floods the

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FIG. 35

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FIG. 36

rest of the composition. Observe the texture of this shadow, and what a difference there is in the texture of a shadow where it falls in the street and where it falls on the walls of the buildings. There is no cross-hatching in it, and yet the roughness of the street is fully indicated and contrasted with the smoothness of the walls of the building. The introduction of the figure adds interest and gives life to the drawing without in any way detracting from the character of the surrounding work, while it contrasts admirably with the texture of the walls and street.

The pen drawings of Martin Rico have almost the qualities of paintings, so strongly do they suggest color. His lines are so used that we forget them in the tones which they form. Yet the lines are used with economy and technical skill. Such freedom and adequacy of handling is the result only of full artistic knowledge. The figures are spotted in so as to give an excellent impression of movement. Their impressionistic treatment is hardly within the range of the beginner.

24. Maxime Lalanne.—Quite a contrast with these methods of working are the sketches by Maxime Lalanne, whose manner is delightful and unaffected. There can be little doubt that Lalanne's method is simplicity itself, as shown in Figs. 37 and 38. Note in Fig. 37 all the details of the chateau; the distant elm tree and the bank in the foreground are clearly expressed without an unnecessary line. The details of Fig. 38 are worked up somewhat more fully, but the full sketchy appearance is maintained admirably. Lalanne depends largely on outlines, and introduces his half tones merely as suggestions to dignify and solidify the structures. The architectural sense of the artist appears strongly in his slightest suggestions of a building. Compare the lines employed in the outlines of the trees with those of the buildings in Fig. 38.

There are many draftsmen whose methods are more captivating at first sight, but there are none whose drawings are better in style than Lalanne's. His drawings show that he understands and sympathizes with the architecture he renders,

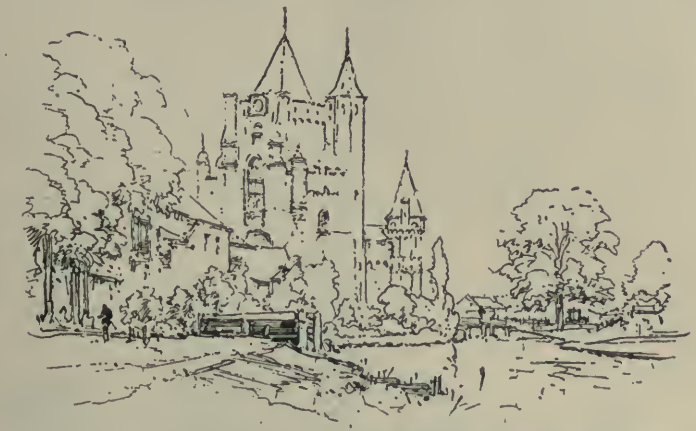

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FIG. 37

By permission of Bates and Guild Company

FIG. 38

as he indicates nothing in a hazy or uncertain way. Each line is drawn to represent something.

25. Herbert Railton.—The work of Herbert Railton, shown in Fig. 39, is in strong contrast with that of Maxime Lalanne's. Herbert Railton's work is rich in coloring, brisk and clever in technique, and quite fascinating in style; it is full of variety, and very clever of touch. It possesses a dash that is certainly absent from such drawings as Lalanne's, and Railton therefore has many would-be imitators. There is much to be learned from this work, but as has been said before, the student must be careful not to be carried away by the clever treatment and elaboration of the details.

In Fig. 39 note how important a part the two figures play in the composition. This can be seen by covering them with the fingers and noting the change of effect. In Fig. 40 the treatment of old brickwork is well worth study, but remember that this is old brickwork partly covered with plaster. Such treatment cannot appropriately be applied to new brickwork. Fig. 41 is the simplest in technique of the three examples, and is therefore perhaps the one offering the most help to the student.

26. Joseph Pennell is an American who has distinguished himself not only as a pen-and-ink artist but as an etcher. His subjects have been largely architectural, and it is not difficult to detect in some of his work the influences of such artists as Vierge and Rico. Whatever artists he may have studied, there can be no doubt that Pennell's handling of the pen is original and quite his own. He suggests light and air at the same time that he represents the charm of architectural groups of buildings or of picturesque nooks and corners. He uses the pen freely, but with full knowledge that every line acts in the effect, that an extra line is wasted, and that nothing must be omitted. Figs. 42 and 43 are excellent examples of his rendering, and illustrate how carefully he has studied the architectural detail of his subjects as well as the atmosphere in which they exist. An artist must do more than draw a portrait of his subject;

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FIG. 39

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FIG. 40

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FIG. 41

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FIG. 42

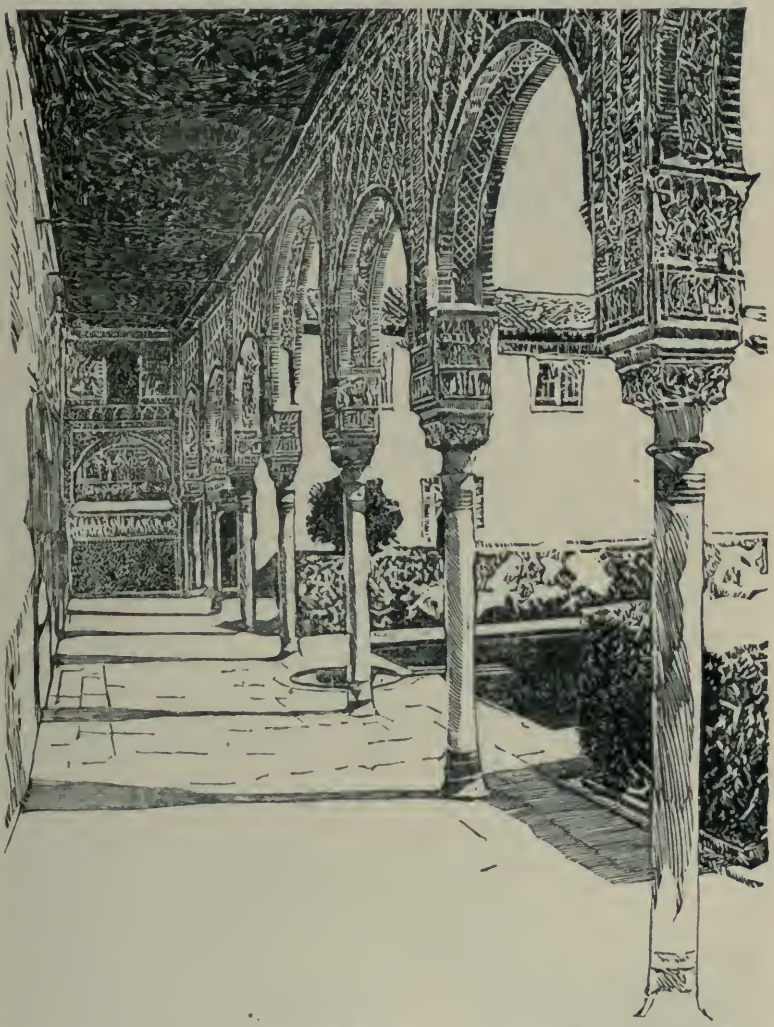

FIG. 43 *By permission of The Century Comp^a's*

he must suggest its surroundings in such a manner that one feels the very atmosphere in which he draws. The sparing use of darks gives to Fig. 42 the light and outdoor feeling that is so noticeable. In Fig. 43 the different qualities of line used to express the various textures are worthy of study.

27. Charles Dana Gibson.—Probably no artist's work in America is better known to the general public than that of Charles Dana Gibson, so that it is unnecessary to describe the general style of his pictures. The technique of his work, however, is hardly responsible for his success as an illustrator, as it is always subordinate to the idea that he illustrates. His work possesses marked individuality and power in his technique, as is particularly well shown in Figs. 44 and 45. In the former a very subtle feeling has been expressed in the difference of line used to depict the figure of the man and contrast it with the delicate, shadowy form of the specter beside him. Not only have these forms been contrasted in idea, but also in the method of handling; one, drawn with a bold and vigorous touch, contrasts with the other, which is executed with little but a ghost of a line. Cross-hatching is here very sparingly used, and is characteristic of Gibson's work. His style of rendering is broad and sketchy. Attempts to outline sharply with a single line are rarely made by him, but with a few well-placed and vigorously drawn lines he expresses, as in Fig. 44, the characteristic ruggedness of his subject, or as in Fig. 45, the delicacy desired to be imparted, according to the character.

28. Alphonse Mucha is a Parisian artist famous for his poster designs. The illustration in Fig. 46 shows his fine draftsmanship and his wonderful use of line. His designs are thoroughly workmanlike in their execution, and in the use of several different widths of line so chosen as to express the more important forms of the composition in right relation to the others, he is masterly. His work should be studied with the greatest care. Its perfection of drawing and grace of line are marvelous down to the least detail. Fig. 47 is a good example of the harmonizing of lettering with the rest

I L T 153—5

FIG. 44

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FIG. 46

FIG. 45

of the design. The exquisite drawing of the folds of drapery and of the hands are points that should not escape the student's attention.

FIG. 47

29. Aubrey Beardsley, who died when he was about 24 years of age, was undoubtedly a genius. His work was often weird and sometimes somewhat offensive in its conception, but technically his use of the pen was masterly. His idea of composition was rare, and his methods have had a lasting influence in decorative design. His drawings can hardly be judged from an academic point of view, but his use of line teaches us many valuable lessons. Fig. 48 illustrates the decision and grace that were characteristic of his work. His original use of the dot forms quite an important part of this composition. The effect of Fig. 49 (while not so simple as that of Fig. 48) is elaborately rich in its decorative treatment. Not a line is used that does not in itself show keen artistry.

30. Louis Rhead. — In Figs. 50 and 51 are two examples of work by Louis Rhead—pictorial illustrations treated in a decorative manner. Notice the well-balanced arrangement of values, the vigorous treatment of figures, and the architecture and details of the landscape. See how all

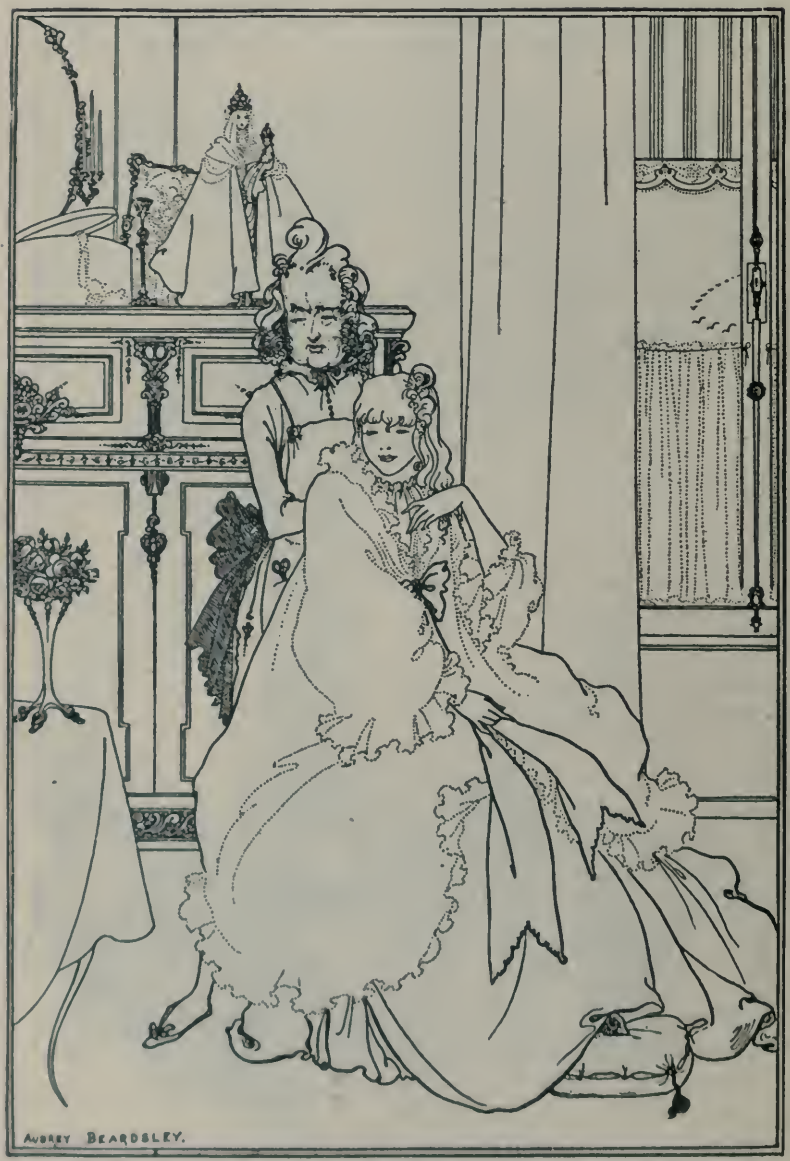

FIG. 48 *By permission of The Studio*

FIG. 49 *By permission of The Studio*

FIG. 50 *By permission of The Century Company*

By permission of The Century Company

FIG. 51

textures have been decoratively rendered so that they give just the proper values in the proper place. The firmness of line of these drawings should be noted and the careful drawing of figures and buildings is worthy the student's attention.

31. Charles Robinson.—Figs. 52 and 53 are by Charles Robinson, an English artist, whose work possesses much originality and personal charm. These two figures were designed to go on opposite pages of a small book and form a continuation of the same idea. In other words, they illustrate the text in a decorative manner, Fig. 52 representing a man standing in a stream of water, offering an ax to the individual in Fig. 53, who stands on the bank. Observe the purely decorative manner of treating this subject; no attempt being made toward realism, but a simple application of decorative principles to an illustrative subject.

32. R. Anning Bell has produced, in England, a number of very graceful compositions in pen and ink. His use of line is quite different from that of Alphonse Mucha, as can be seen at a glance. It is apparent that he frequently uses a quill pen, as his lines are rich and bold. Many of his drawings are in outline and black alone. His spotting is very attractive, and altogether his results are rich and highly decorative. Fig. 54 shows a bold use of black that is very pleasing. The great simplicity of this composition gives it much of its charm. The delightful suggestion of the distant city over the trees interests us and stimulates our imagination, and yet its treatment is really very simple. A very few well-chosen lines tell the whole story.

33. E. H. New.—The work of E. H. New shows a difference of method from that of Railton, but the works of these two men are interesting to compare as being standards of the English style. New does not employ so nervous a line as Railton and the effect of his line drawings is toward a gray. In decorative treatment he gives texture to his work that makes his drawings admirably suited to design, and when printed on a page of rather heavy type his drawings harmonize beautifully. The book-plate design

FIG. 53

FIG. 52

shown in Fig. 55 serves well to illustrate the decorative quality of his work.

The directness, firmness of drawing, and strength and simplicity of effect in New's work, give it a high place among that of the decorative illustrators. Notice that he employs largely straight lines while Railton is fond of curving lines. The lines of New appear to be slowly drawn, while those of Railton seem to be rapidly swept in.

34. Joseph Sattler.—Fig. 56 shows a book plate designed by Joseph Sattler, a German artist. His work is very vigorous; his lines, bold and well placed, while simple in composition, render his drawings pleasing and satisfactory. The action in the figure of the skeleton in this example is well expressed under the weight of the books, while the balance in the composition is maintained by the cipher initials of the owner in the lower right-hand corner. Note that both the elements of design and composition are clearly expressed in the methods of procedure of this artist. As this design is for a book plate to be placed within the cover of the book, indicative of ownership, the two important things here, from a utilitarian standpoint, are the books and the man that owns them. These are combined in the design by prominence given to the books in the upper left-hand corner and prominence given to the man's initials in the lower right-hand corner, thus establishing a balance about the center. Note, however, that in balancing the values the books that have been made of the stronger value are placed nearer the center of the picture.

35. Will Bradley, an American, shows materially the influence of Beardsley's work, as can be seen by a study of the cover designs for The Inland Printer herewith reproduced, Figs. 57 and 58, which are particularly characteristic of Bradley's methods of working and show the influence of the Beardsley school. His work is individual, and the best of it is of a very high order of design. Observe in Fig. 59 the clever balancing of the masses of the two figures where the black figure with the white muff is beside the white figure

FIG. 54

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FIG. 55

By permission of The Studio

FIG. 56

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FIG. 57

By permission of The Inland Printer

FIG. 58

By permission of The Inland Printer

FIG. 59

with a bunch of black holly. Note the careful spotting of the background in such a way that the black and white forms a half tone that contrasts beautifully with the two figures.

Bradley's lettering on these cover designs is well worthy of study also, as it is always excellent in style and beautifully related to the design itself. In decorative designs of this character the lettering forms quite as important a detail as the design itself; in Fig. 57 it forms the important feature of the design, the figure in the corner being purely secondary. In Fig. 60, however, the lettering is of less importance, but observe how it forms a proper black spot to balance the figure on the left of the cover. Note also how outline is ignored entirely here and that all the details of this design are formed by carefully placed masses of black and white that give at once an ingenious design and a highly decorative effect. The lettering in Fig. 58 is an example of skilful and decorative work.

Fig. 61 is another cover by Bradley wherein the general tone is entirely dark, but by means of a few small masses of white a figure is outlined that adds dignity and character to the whole.

36. Examples of Cover Designs.—In Fig. 62 is shown a cover design by Hapgood which is greatly different from those by Bradley that have just been described. It is an admirable blending of decorative forms with properly balanced lettering. The lettering is well related to the design and the total effect is rich and strong.

In Fig. 63 is a design by Frank Hazenplug, the lettering of which is admirable and forms the principal feature.

Entirely different from these are the two designs shown in Figs. 64 and 65 by Leydendecker, the latter characteristic of the French poster style, while the former is more symbolic and conventional.

In studying these cover designs for the same publication by different artists, the student can follow the simplicity of idea and yet observe how totally unlike the renderings of different artists are when applied to the same purpose.

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FIG. 60

By permission of The Inland Printer

FIG. 61

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FIG. 62

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FIG. 63

By permission of The Inland Printer

FIG. 65

By permission of The Inland Printer

FIG. 64

37. Importance of Texture in Composition.—Too much cannot be said on the subject of texture in composition, and appreciation of the use of line for the rendering of certain subjects. Much can be learned from the careful and intelligent study of good artists' work, but nothing can be obtained by an attempt to copy their style. It may truly be said that all lines and tones used by these artists are illustrated in Figs. 4 and 18; and that all the variety of style, appearance, technique, and composition that is found in their work is due entirely to their personality and individuality.

As pointed out, Gibson uses a light, delicate line for a delicate subject, and a bold line for a bold subject. Beardsley, in Fig. 48, uses a bold line for his outlines, and a delicate, dotted line for the flimsy lacework and puffs of the woman's gown. Herbert Railton, in Fig. 40, uses a sketchy, scratchy line to indicate his old brickwork and partially crumbled plaster; while Gregg, in Fig. 20, indicates the firm stonework in his tower by carefully placed values indicative of coursed masonry, with a suggestion here and there of a crumbling joint. Martin Rico secures the feeling of brilliant, warm Venetian sunshine in his pictures by using large masses of white contrasted with rather deep shadow, whereas Maxime Lalanne creates a similar impression by the subtle delicacy of the details in his sketches without expressing any deep shadows at all.

The student should therefore realize that in practicing pen work he is not to judge the results of his efforts by the appearance or style of his own productions, in comparison with those of some one else. His style will develop as he proceeds, and his work become characteristic of himself as the work of the artists herein illustrated has become characteristic of each of them.

RENDERING WITH PEN AND BRUSH

INTRODUCTION

MATERIALS USED

1. Outlining.—The outfit required for pen-and-ink rendering is simple, but each detail should be the best of its kind. The preliminary pencil drawing should always be carefully rendered in outline with a finely pointed pencil, and nothing left in the way of outline to be afterwards executed with the pen. When the pen does any outlining at all it simply traces the outline over the pencil line, but as a rule it will be found that outlines are ignored in pen drawing and that the pen is used simply to express masses of light and shade, leaving the outline to take care of itself.

2. Erasers.—A soft rubber should be used to correct errors made in the pencil drawing, and a sharp knife may be used for scratching out failures in the inking, but the knife should be used very sparingly, as it is very difficult to work over a scratched spot and produce a neat line.

3. Paper.—For paper, a good quality of bristol board should be used. The surface must be smooth and well calendered, so that there shall be no tendency for the ink to spread. Almost any smooth paper with a hard surface may be used, but it should be tested by drawing the pen across the surface to see that it moves freely and smoothly and leaves a fine, unblurred line of ink.

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Experimental rendering may be tried by placing over the pencil sketch a piece of transparent tracing paper, and rendering the drawing on the tracing paper without the outline. Several systems of rendering can thus be experimented with before the final rendering is attempted. The pen drawing on the tracing paper can be mounted on cardboard and preserved if desired.

4. Pens of various brands are made and sold especially for drawing, and although certain of these are excellent in the hands of an experienced draftsman, it is not at all necessary that any special make should be used during study. Gillott's No. 303 will make as fine a line as is necessary or desirable in a pen drawing that is intended for practical work; that is, for work that is to be reproduced as an illustration. Gillott's No. 404 is fine enough for bolder lines, and Esterbrook's bank pen, No. 14, is excellent for certain kinds of work. An ordinary, old-fashioned quill pen is very serviceable for decorative work where a broad, rich line having something of the quality of a brush line is desired.

The beginner should use a coarse pen rather than a fine pen; an Esterbrook's bank pen, No. 14, will be found excellent for this purpose. The student will find that he can secure as desirable a quality of line with this pen as with any other, and by perseverance he can master it and make it serve its purpose. Above all things, the student is advised not to change pens, but to stick to one kind until he masters it. It should be remembered that even the best of pens is a stubborn instrument. Practice is the only cure for its unwieldiness, and a great deal of practice is necessary in order to train the hand and the pen to work together in harmony. The pen should always be drawn toward the draftsman when possible, and when it is moved sidewise it should be turned so that the under side of the pen moves away from the line being drawn. A pen, in pen-and-ink drawing, should never be moved sidewise, as such movement produces an uneven line and is likely to spatter the ink by the point catching in the pores of the paper.

5. Ink.—Perfectly black ink of any kind may be used for pen drawing. Sepia or brown inks are sometimes used, but are of no importance except for special effects. Black ink is absolutely necessary if the drawing is for reproduction by photoengraving, and in any case the effect of the drawing is materially damaged by any variation in the color of the ink with which it is drawn. Several inks on the market give satisfactory results. Among these are Higgins's American drawing ink for pen work, Higgins's general drawing ink for wash work, Stafford's waterproof and not waterproof inks for similar purposes, and l'Encre de Chiene Liquide, a French product that is of practically the same value.

COMMON ERRORS OF BEGINNERS

6. Before undertaking any general exercises, it will be well to point out the tendency toward which the average beginner finds himself wandering. Fig. 1 is a reproduction of a drawing made by a student that had not properly mastered his scale of values or his rhythm of line. It is not a bad drawing for a novice, as from it one can see that he has tried to obtain certain effects, but it is subject to the following criticisms:

1. There is a lack of balance in the picture. The left side, by its dark spots, attracts the eye more than the right side, and there are two masses of nearly equal size on the left—one formed by the trees *a*, *b* and the other by the door *c*, with the wall at the side, the roof over it, and the small mass of foliage over the roof. All of these details are so nearly of one value that they form practically a single dark spot in the left half of the picture. Two equal masses of black in a picture, even if equally balanced, are not desirable, as they divide the interest and have no unity of effect. In this case, these two equal masses are doubly disagreeable, as they are not balanced about the center.

2. The values in this drawing are uncertain; that is to say, they lack purity and definiteness as well as rhythm. For example, the roofs *i*, *g* are, in general effect, of about

the middle value, and are spotted with darker and lighter values; this spotting adds no interest, gives no idea of its material or texture, and is in itself ugly. The walls *d* and *e* contain lines so light and weak and so hesitatingly drawn, that they do not produce any effect whatever either of color or of texture. They do not tell whether the wall is of wood,

FIG. 1

stone, or plaster, or that any shadow falls on it; in fact, they tell nothing, and might better have been left out entirely.

At least a part of the wall *d* should have been left white, and another part of it might have had a few suggestions of stonework or broken plaster in order to give an idea of its material. If it is in shadow, we should see a tint; but instead of that, where we should see values we have simply scratches.

The same may be said of the lines *f* introduced into the foreground and those in the sky at *h*. These lines neither tell a story nor represent value; they are simply meaningless. It would have been better to have left the ground and sky plain; or, if a value were needed, it should have been definitely rendered and represented by lines of the proper kind.

3. The drawing is so lacking in definite values that there is no possibility of a rhythmic movement from dark to light. The lines are not properly related to one another and there is a harsh, disagreeable effect instead of a soft, pleasing one. The lines themselves are bad throughout. Even in the enclosing line of the drawing, there is a lack of firmness and evenness of stroke. Study any individual line, and it is seen to vary in weight and strength, and its direction is uncertain. This is in itself a fault. Whatever may be the width of a line, that width should, as a rule, prevail throughout its entire length. It should begin firmly and end firmly, and not taper off to a point as these lines do.

Another fault in the use of lines is seen in the shadow within the door at *c*. A few broad, rich strokes would have given this point its proper tone and value. The results with this method are mussy and muddy, in the same manner as on the roof at *g*.

4. There is a lack of rhythm in the lines between *a* and *b*. The horizontal lines at *a* have no relation whatever to the curved, scratchy lines above at *b*, and neither of them expresses texture. In fact, none of the lines in the drawing makes any attempt to express texture. The strokes at *b* fail to give anything like a leafy effect; compare these with the drawings of trees by Pennell in Fig. 42, *Elements of Pen-and-Ink Rendering*. The chimney does not tell us whether it is of brick, stone, or plaster. There is nothing anywhere to indicate material; compare it with the representation of brick by Railton in Fig. 40, *Elements of Pen-and-Ink Rendering*.

The window treatment is monotonous; the lines are lacking in the lightness of touch that would suggest glass. The window as a whole is too dark; it simply forms an isolated spot in the drawing. The lines in the foreground are

without any meaning whatsoever, although there has been an evident attempt to express the idea of grass with a few short, vertical strokes. Observe the treatment of the foregrounds in Figs. 29 and 40, *Elements of Pen-and-Ink Rendering;* the lines are few, but they clearly tell a definite story of earth, stones, grass, and weeds.

DRAWING PLATES

DRAWING PLATE, TITLE: PRELIMINARY PEN PRACTICE

7. The work on this plate is to be done by the student and sent in for criticism, in order that we may judge how much he has profited by the preliminary instruction given.

On a sheet of bristol board, 14 inches by 18 inches, draw a border line enclosing a space 13 inches by 17 inches, and divide the rectangle so formed through the middle by a line *a a*, 8½ inches from the end border lines. The line *b b* is located ½ inch to the left of *a*. *c c* is 6¼ inches above the lower border line, and *d d* is ¾ inch below *c*. These lines will divide the drawing plate into four sections, each one containing a number of figures. Vertical lines *e e* and *f f* and a horizontal line from *e* to *f* should be drawn ½ inch above the lower border line.

Figs. 1, 2, and 3 are contained in three rectangles 3½ inches by 2½ inches, which have a line 1 inch below the upper border line as their upper limits. Immediately below them Fig. 4 is drawn extending from the line *e e* to the line *b b*, 1 inch in width. Fig. 5 is drawn within a rectangle 1 inch in width and ½ inch below Fig. 4. Fig. 13 is ¾ inch below Fig. 5 and ⅜ inch in width. Fig. 14 is ½ inch below Fig. 13 and ⅜ inch in width. Figs. 18 and 19 are ½ inch below Fig. 14 and are 3¼ inches by 3 inches. Figs. 6 and 7 consist of a series of squares each being ¼ inch below the other, with ⅜ inch between the sets. There is also ¾ inch between Fig. 7 and Fig. 12, and the details or stripes of Fig. 12

are 1 inch in width and $\frac{1}{4}$ inch apart. Figs. 15 and 20 are $2\frac{1}{4}$ inches by $3\frac{1}{4}$ inches, with a $\frac{1}{2}$-inch space between them. Figs. 21, 22, and 23 are 1 inch wide and $\frac{1}{2}$ inch apart. The space between these last three figures and Fig. 12 is then divided into two parts to make space for Figs. 16 and 17. Following these instructions, the student will have no difficulty in laying out the drawing plate ready to commence his pen work.

8. Each of the figures or exercises on this plate should be practiced repeatedly, before the student attempts to draw it on his drawing plate; but in practicing it is not necessary that he should make a duplicate or facsimile of such exercises as Figs. 1, 2, 3, 16, and 17, but simply an effort to render lines in that style, according to the directions here given. All of the subdivisions of the plate should be made with a **T** square and triangle and drawn in pencil, and after the plate is finished the pencil lines should be erased and the drawing plate sent to the Schools for criticism. All of the ink work on this plate is done directly, without any pencil foundation, except Figs. 16 and 17, in which the outlines have been previously drawn in pencil.

Generally speaking, the lines of these different exercises are drawn at different rates of speed. All vertical, horizontal, and diagonal lines, which are practically straight lines, are drawn carefully, deliberately, and evenly. They start abruptly and end suddenly, and should not taper off to a point where they finish.

Fig. 5 is made up of lines very slowly and carefully drawn. It should take about 10 seconds to complete one of the horizontal lines of which Fig. 5 is composed. In Fig. 8 the lines are drawn more rapidly, one following the other without any general attempt at exact parallelism but simply to secure a tint. The student will observe the difference in quality owing to these two conditions. Fig. 1 consists of groups of lines that are practically vertical and parallel. They are drawn with a moderately brisk movement, about half way in speed between Figs. 5 and 8.

Fig. 2 consists of a series of horizontal lines. In this work practice is imperative. It is more difficult than Fig. 1, and the lines must be more slowly executed.

Fig. 3 is more difficult than either of the preceding, owing to the change of direction of the different groups of lines. Some of the lines are drawn from right to left, and others from left to right. The horizontal lines in Fig. 2 are drawn from left to right, and the ones more nearly approaching horizontal in Fig. 3 should also be drawn in that direction. Observe that the principle of rhythm has been carefully observed in the arrangement of these lines, and see in your exercises that you are equally careful. See that each group of lines follows the preceding one naturally and is not butted up against it at an obtuse angle.

Whichever figure is drawn, the effort should be to keep the lines an even thickness, using a definite amount of pressure throughout the entire stroke. In each of these groups the lengths of the lines vary, and some of them are simple curves, some reverse curves, and some straight lines. This slight curvature of shade lines, varying under different conditions, gives a variety and grace to the work. In rendering this plate, do not attempt to copy any particular figure, but simply produce a series of tints after the manner they have been produced here, using the same direction of line and rendering it in the same manner.

9. In Fig. 4 we have an even value, made up of slowly drawn lines. The strength of the lines is uniform throughout the figure, and the spaces between them, though varying slightly in some places, is practically the same throughout so that it produces the effect of an even shade. Many of the lines are broken, but care has been exercised to see that several breaks do not occur together, so as to produce the effect of a white line.

Fig. 5 differs from Fig. 4 only in the direction of the lines. The pen is turned, in drawing from left to right, in order that both of the nibs or points shall rest evenly on the paper. The lines should be broken from time to time as the

work proceeds, and an effort should be made to avoid an even waviness.

Figs. 6 and 7 should be drawn according to preceding instructions. Each of these represents a scale of five values. Draw the darkest value first. In both instances use considerable pressure on the pen and execute each stroke slowly. Place them so close together that they run into one another, except at a few points where the white shows through, but be careful not to make any blots. Considerable ink runs from the pen to the paper in making this dark value, and it is sometimes necessary to take up some of it with a piece of blotting paper. In so doing, let only the edge of the blotting paper touch the top of the ink; do not press the blotting paper to the drawing paper or a blot and a pale shade of ink will result. After making this darkest value, wait for it to dry, and then put in the middle value, using a moderate pressure and noting carefully the space between the lines in order to preserve uniformity. Follow the middle tint by the dark gray below it. The stroke for the dark gray is of about the same weight as that used for the darkest tint, but the lines are spaced farther apart. The lighter gray tint is prepared with lighter lines than those of the middle tint and spaced farther apart.

10. - Sometimes the ink dries rather slowly; do not try to hurry by heating it, or by touching it with a blotter except as before stated. To avoid smearing the drawing when it is wet, lay your board aside and practice the next exercise on a piece of waste paper. In this way, no time will be lost and the work will proceed without interruption.

Figs. 8, 9, and 10 illustrate a more rapid use of the pen. To acquire this rapid stroke and at the same time to keep the lines uniform in spacing and weight, requires considerable practice, but the freedom acquired by such practice is of the greatest service. To all appearance the lines of these figures are careless, but they are "carefully" careless; that is to say, their careless appearance is a matter of study and does not arise from carelessness in execution. These

exercises differ from those that precede, inasmuch as some of the lines cross one another and produce at these points darker values. Care should be taken, however, that blots do not occur in running a new line over one that is still wet, with a pen that is overcharged with ink.

In Fig. 8 the long rectangle should be tinted evenly with a series of lines, such as appear at its right end. It will be observed that most of the lines are not long enough to extend across the rectangle and that two sets are necessary in order to cover the space. When the second series of strokes is drawn, no attempt should be made to have them join at the ends of the first ones exactly. It is better to let them begin between the lower ends of the first set. When the space is covered, go over the left half to darken it to the value of central gray by means of strokes of the same weight and kind. These lines make a very slight angle with the first set.

In Fig. 9 the first value made is middle gray, with a series of fine strokes somewhat heavier than in Fig. 8 and with smaller spaces between them. The left half of the space is then darkened by lines of the same weight but inclined at a slightly different angle.

Fig. 10 is executed in the same manner as Figs. 8 and 9, with the exception that greater pressure is used. The right half should start with a dark gray, and the left half should grade up to the darkest value of the scale. Hereafter this tint will be called black; but by this is not meant a solid black but a line-tinted black, such as is shown at the bottom of Figs. 6 and 7.

Fig. 11 is composed of slowly and carefully drawn lines similar to Fig. 5, from which it differs only in value. The width of the line is obtained by an even pressure. The lines should be broken wherever necessary, care being taken that two breaks do not occur in the same place so as to form a white line across the figure.

Always lift the pen from the paper when the line has been drawn as far as an unconstrained movement of the fingers will permit. This should be done abruptly so that the line shall not taper off to a point, as is otherwise likely to happen.

Fig. 12 is similar to Fig. 11, except that it is darker and corresponds with the last tint of the color scale at the bottom of Figs. 6 and 7. The lines are drawn close together so that they occasionally blend and produce a ropy effect. This method of rendering is frequently used in the roofs of buildings.

Figs. 13 and 14 are drawn with lines of moderate rapidity and differ only in tone. Fig. 13 is equal to middle gray, while Fig. 14 is dark gray, becoming black at the bottom where extra pressure is used, causing the lines to unite. Observe the slight curvature of the lines, which is much less than that in Fig. 1. The slight changes in the direction of this curve helps to prevent the mechanical appearance that would result if the lines were all exactly parallel. This treatment of lines is frequently employed in the rendering of shadows under the eaves of houses.

In Fig. 15 is a graded exercise working from black to light gray and executed in the same manner as explained in connection with Figs. 5, 11, and 12.

Fig. 16 introduces a new quality of line. The strokes are made from left to right rapidly and close together. They are very short, of different lengths, and much finer than any that have yet been drawn. The changes of direction and upward curvature give them character and variety. Such lines are useful in representing masses of foliage or trees.

Fig. 17 is identical in character with Fig. 16, except that some of the lines are drawn from right to left and are accented on the ends of the strokes. They are also several tones darker than in Fig. 16, greater pressure being used.

Fig. 18 shows a method of covering a large surface with a middle gray value. The lines are like those used in Fig. 16, but are drawn from the top down. They do not touch at the ends. Fig. 19 shows a tint graded from dark gray on the left to light gray on the right. This change in value is produced by a diminution in pressure and an increase in the spacing of the lines.

Fig. 20 is a problem similar to that in Fig. 10, except that the lines more nearly approach the perpendicular. The

gradation, however, is from black at the top to gray at the bottom, and is produced by drawing two sets of lines—one forming an even gray, and the other crossing it at an angle and forming black.

Figs. 21, 22, and 23 are examples of surface shading with vertical lines. In Fig. 21 the lines are drawn carefully and slowly and are slightly curved. If these lines are crinky or wavy, as shown, it diminishes the mechanical effect. But this quality of line should not be studied or sought for. It should come merely from the unsteadiness of the hand when moving slowly. In Fig. 22 the tint is made up of short lines whose ends are permitted to join. These lines are drawn rapidly in order to cover the surface freely. In Fig. 23 is illustrated a very broad and free way of covering a surface. It might be called *scribbling*, as the lines are drawn so rapidly that sometimes the upward stroke of the pen still makes a mark on the paper. This is not to be recommended for general drawing, as it is likely to produce slovenly work, but it is useful when a sketch must be made in a hurry and changing values be recorded while they last.

After each of these figures has been drawn, rule two lines $\frac{1}{4}$ inch below the upper border line and $\frac{5}{16}$ inch apart, between which carefully pencil in the outlines of the title. The vertical elements may be strengthened in pencil by means of the T square and triangles, but the inking should be done entirely freehand. The date should then be placed in the lower left-hand corner, and the name and class letter and number in the lower right-hand corner, after which the border line should be inked in freehand and the plate cleaned up and sent to us for criticism.

DRAWING PLATE, TITLE: INTRODUCTORY EXERCISES

11. This plate makes practical use of some of the tones and values practiced on the preceding plate. The objects selected are so simple in character that the student should be able to get duplicates, or objects similar to them, to render from nature, besides copying the drawing plate.

This plate is accompanied by a sheet of drawing paper on which are printed the outlines of the figures that are to be rendered with pen and ink. The student will find it necessary, however, to practice these figures on separate sheets of paper in order to gain facility in the handling, and he should not ink in the outlined figures sent him until thoroughly satisfied that he can render them satisfactorily.

In his practice work he should carefully copy these figures, even though his final work be drawn from the actual object. Working from these will fit him to judge how to render the others. It will be observed that on the different objects rendered the lines are drawn in different directions. Different tones or values are expressed to indicate differences of material. The study of these values in the representation of texture is of vast importance.

Should the student prefer to draw these outlines himself, and prepare entirely his own drawing sheet, he may proceed as follows: The drawing plate should be divided within the border by a vertical line *B B* through the center of the plate, and a horizontal line *A A* $6\frac{1}{4}$ inches above the lower border. A light pencil line should then be drawn around the plate $\frac{3}{4}$ inch within the border, to form the outside lines of the rectangles in which these figures will be drawn. Two vertical lines should be drawn at *C* and *D*, 6 inches from the left-hand and right-hand border lines, dividing the upper half of the plate into three rectangles, the lower half being divided into two rectangles for Figs. 4 and 5. Carefully draw in outline each of the figures here represented, enlarging it sufficiently to make it bear the same relation to the drawing plate that it bears to the printed plate. After the outlines have been satisfactorily drawn, clean the plate with a soft rubber preparatory to the rendering of the drawings. The student can proceed with the renderings or he may do his rendering directly on the outline sheet.

12. Fig. 1 is a paper box presenting simple, plain surfaces. The handling is direct and significant. Vertical surfaces are emphasized by a tint of vertical lines; the

oblique surface *a* is rendered in oblique lines, and the shadow *b* is rendered in lines conforming to the slant of the surface on which it falls. The shadow of the box *c* is made up of lines that take their direction from the direction of the light that casts the shadow. Observe that in this simple rendering three values have been used besides white; namely, light gray, middle gray, and dark gray. The light gray is used at the back and inside of the box and on the flap at *a*; the middle gray is used in the shadow of the flap at *b* and the inside of the box, and the front of the outside; and the dark gray, as the cast shadow of the box *c*. The cast shadow here, as always, is darker than the shaded side of the object, which is affected by reflected light. None of the lines in this rendering are drawn rapidly. They are applications of the exercises shown on the previous plate in Figs. 4, 6, and 7. Notice that the lettering on the box is expressed by values only, no attempt being made to make it readable. Observe also that in many places the outline of the box is omitted, as the shadow is sufficient to mark the boundary of the surface. This is particularly observable at *d*.

13. In Fig. 2 the values are rendered by more rapidly drawn lines. This gives a snap to the drawing and emphasizes the lightness of the material; in other words, gives it character. The shaded surfaces *a*, *b* are not expressed by one series of lines like those used in Fig. 1, but are made up of several series of short lines. The rim about the top of the box is expressed in the shadow *a* by a slight space between the two series of lines that make up the shadow. In the shadow *b*, the rim is expressed partially by the same means and partially by touches added to indicate the lower edge. The introduction of cross-hatchings in the shadow at *c* is a simple method of giving the gradation that shadows possess; namely, of being darkest near the object that casts the shadow, though sometimes, through the effect of contrast and reflected light, they are darkest at the outer edge.

The light, sketchy treatment of the details and the use of the lightest value in the background, are points to be carefully noted. The background is rendered in such a manner as to die off at the edges irregularly, and in the most unobtrusive manner. The direction of line in the rendered value follows the same laws as in Fig. 1, and in rendering it the student should bear this in mind. He should also take pains to indicate the thickness of the basket wherever it appears, as this is another detail that gives the character of the material it is made of.

14. Fig. 3 is a more difficult problem, in that it exhibits curved surfaces. This involves the necessity of changing the direction of the line on different parts of the surface. The original of the object here shown is a clay vase, rather crude in form and of a character that did not demand a treatment that would suggest smoothness or finish. The lines should be drawn at a moderate rate of speed, but with care and attention. They are short and form groups that follow each other about the surface. The darker tones at *a*, *b*, and *c* are indicated by heavier lines slightly cross-hatched. At *d* and on the body of the vase a lighter value is introduced as the shade meets the light. This adds to the effect of roundness.

This study will require careful practice, as the rendering of globular and cylindrical surfaces is not easy. It is not likely that the student will be entirely successful with his first attempt nor with his second, but pen rendering is not easy and perseverance alone will bring about satisfactory results.

15. Fig. 4 shows a pile of old books. Books always make interesting subjects for drawing. In making a group to sketch from, a variety in size and thickness should be sought. In this illustration not only is the appearance of old books well carried out, but the different textures of the different covers is clearly indicated.

In placing these books, their relative sizes have been carefully considered. The largest is naturally placed on the

bottom, and the angles at which one is placed on the other differ sufficiently to give the impression that they have been carelessly laid down after reading. The reading glass gives a touch of interest and suggests that perhaps the books have been read by an old person. These details are of importance. They convey an idea of something beyond the illustration and help the picture to tell a story.

The values in this study range from white to black; the direction of the lines corresponds to the direction of the surfaces. The lines used in rendering the books are all slowly drawn. The slow and irregular line serves very well in the expression of the warped and uneven old covers and the edges of the leaves. In the reading glass a more regular touch is needed to give the effect of smoothness to the glass and to the metal rim and ebony handle. The lines are more crisp and decisive than those on the books, and indicate the difference in the texture of the material. Note how the light edges on the back of the books *a*, *b* are shown by a break between the series of lines that render the backs and tops. A similar treatment occurs in the handle of the reading glass at *c*. In the back of the book *b* the addition of lines drawn between the first series darkens the value at the right places to express the modeling. The shadows, both of the books and of the glass, are drawn briskly with light, rapid lines. Observe that, while the leaves on the ends of the books are indicated by a series of wavy, parallel lines, the thickness of the covers is expressed by a series of short, vertical lines in the direction of that thickness.

Examine this drawing carefully and observe that a hard outline is not introduced at any point where it is unnecessary. The little, uppermost book is outlined against the one below it by the stopping of the deep tone that indicates the cover of the latter, and the back of the second book is profiled against the cover of the bottom book by the meeting of the tones rather than by a hard line. The breadth of this study and the completeness of its effect show the advantage of avoiding fine lines, except where necessary to express smooth surfaces.

16. Fig. 5 is a group from the garden, consisting of curved surfaces rendered with carefully drawn lines characteristic of the surfaces they express. There are no deep tones on either the water pot or the flower pots. The outlines of the objects themselves are so distinct as to tell what they are, and no heavy shading is required to indicate their curvature. Observe, however, that the curved handle of the water pot is shaded with lines that follow its curve, and that the sides are rendered with vertical lines carefully and evenly drawn. In the shade these lines stop just below the top to indicate the rim, or ring, that is turned about it, while a slight shading under this ring expresses it in the high light. The inside of the water pot is rendered with a darker tone, inasmuch as it is naturally much shielded from the light. The flower pots are simply rendered with lines, parallel to their tops, rapidly and crudely drawn in harmony with the crude material of which they are made.

DRAWING PLATE, TITLE: DETAILS AND ACCESSORIES

17. This plate contains a series of what might be called practical problems. Every element on it is likely at some time to become an element in the drawing or rendering of some illustration or picture. No difficulty should be experienced in following the instructions and presenting a perfectly satisfactory drawing. Each surface should be carefully studied in order that the values of the different textures may be properly rendered.

For the purpose of practice, the figures on this plate should be carefully laid out, or traced, and transferred, according to the outlines on the outline sheet. Although many parts of the finished drawing appear freely and carelessly rendered, the original pencil sketch is very carefully outlined in all its detail before the rendering is commenced. By this means the draftsman always has a definite position for his lines, and each line can be made to express a separate detail. A drawing may look sketchy and free when the pencil lines are

erased, but it can never appear satisfactorily so unless the pencil sketch has been carefully executed. The outline drawings accompanying this plate show how careful one must be in making his preparatory sketch. At the same time his finished renderings on the drawing plate show how free the results from these careful preliminaries can be made to appear.

Do not make the mistake that many beginners do, that freedom, or sketchiness, in rendering a drawing implies that it was not carefully drawn in the beginning. The pencil work must be executed with the utmost care to warrant freedom in the rendering. While as has been said "Nature abhors an outline," and while it is advisable to use in pen work as little outline as possible, it is all the more necessary that the outline shall be clear and definite in the pencil drawing in order to show just where to put the shadows that are to express it in the rendering.

It will be best not to sketch in pencil more than two or three of the figures on this sheet at one time, before an attempt is made to render the drawings. First, draw the border line in pencil, and then by a vertical line and a horizontal line divide the plate into quarters. The location of the individual figures in these four parts can then be made by freehand subdivisions.

The first four figures on this plate are representations of roof textures, and care must be exercised not to overdo the rendering, or the drawing will lose that very characteristic that should be obtained; namely, the suggestion of the material. This depends as much on the way the pen is handled as on the kind of line that is drawn. Figs. 1, 2, and 3 show roofs of old cottages in England, while Fig. 4 is a tile roof in Venice.

18. In Fig. 1 the roofing material is a red tile and is indicated in a general way by making the value of the roof tone a light gray. The oldness of the house is shown by the wavering of the lines that show the courses of the tiling. That some of the tiles have loosened and others become

dislocated entirely or discolored by moss, is suggested by patches of deeper shade at irregular intervals. The overlapping of the tile courses is indicated by the character of the outline *c*. Compare with the roof lines the lighter lines used to indicate the weather boards on the building at the left side *b*. Note how carefully, and yet sketchily, the distant ends of the weather boards are touched in to indicate that one board laps over another. Note that the lines of these boards are not carried entirely across the house, yet they convey to the observer a certainty that the material continues in the same manner where the paper is left untouched. Diminishing this value on the end of the building to a dead white where the roof overhangs, greatly helps the general effect of the drawing.

The shadow of the overhanging roof *d* is drawn with a series of brisk lines, slightly accented at the bottom in order to express the abruptness with which the shadow stops and by the contrast, to give the feeling of sunlight. The direction of these lines suggests the direction in which the sunlight falls. Care must be exercised to keep this shadow in proper contrast with the roof above it. The value of the shadow diminishes as it becomes more distant; this increases the effect of perspective. The dark part of the shadow under the darkest part of the roof is brought into strong contrast with the side of the house that is left white. The greatest contrasts are those at the angle of the house that is nearest to us and gives an appearance of recession in the distance.

To indicate all the lines of the windows would not only be practically impossible but decidedly uninteresting. The details have simply been suggested, and the shadow that would naturally exist within the entire window on the end of the house has been limited on the upper side to prevent the introduction of a black spot in this light surface, which would materially affect the composition.

In Figs. 5 to 9 a more detailed rendering of windows is given, because in these the entire drawing consists in the representation of a window, whereas in Fig. 1 the window is only a portion of the whole building. In Figs. 5 to 9,

the drawing of the shadows is the principal means of bringing out the forms; but in Fig. 1 less shadow was required, and the introduction of shadows indicating sash and muntins gives all the effect that is necessary.

At *e* a small mass of foliage without detail is introduced simply to give balance to the drawing and offset the dark masses at the right-hand side. The texture of this foliage is such that there is no doubt whatever as to its material, and it is rendered with a series of lines similar to Figs. 16 and 17 on the plate entitled Preliminary Pen Practice. In drawing foliage, the general character of the edges, or outline, should claim the first attention; the next aim should be to get the value in tone by means of free, loose strokes, which in a general way should follow the direction of the leaf masses. Note throughout all these drawings how the lines are occasionally broken in order to give the effect of light and transparency.

19. The thatched roof in Fig. 2 presents an entirely different problem. Thatch is a fascinating texture to indicate and is well suited to the pen. The left side is in shadow and is therefore covered with a light-gray value of short lines broken to show the different layers of straw. The right side is in full light, and is therefore left white with only sufficient shading to indicate that this, too, is thatched. These irregular indications also suggest the unevenness of the surface.

The character of the lines used in the rendering of this roof is radically different from that in the tile roof. The rather fine and loosely drawn lines admirably suggest the straw in the thatch. On the shadow side of the roof *a*, the overlapping courses of straw are indicated by the overlapping and accented ends of the lines.

On the small roof *b* we again have a tile texture. The chimney, however, being built partly of brick and partly of stone, introduces still another texture. On the light side little detail is attempted, only an occasional touch indicative of the irregular forms of which it is composed. On the

shade side, however, considerable attention is given to the individual bricks.

While, as has been said, the drawing of individual bricks is not necessary to indicate a brick wall, still the dark tone on the shadow side of the chimney and wall may be rendered quite as well by a series of partially rectangular forms as by a series of long, straight lines. These forms, therefore, serve a double purpose—that of giving texture to the surface, and that of representing it in its proper tone. The principles of building construction must be observed in the rendering, and the joints between the bricks must break alternately. In good practice no brick joints come directly over the ones immediately below.

At *c* the chimney is clearly shown to be of small stones. This is clearly indicated by the rounded edges and irregular outlines. At *d* the material is plaster, shown simply as a flat value between the vertical and horizontal lines of the framing. The lines forming the shadow of the eaves on the tile roof conform in direction to the slope of the roof, while those on the vertical side of the house at *e* are vertical.

What was said in connection with the foliage of Fig. 1 applies equally well in the rendering of the small bit of vine at the right of Fig. 2. This foliage is of no importance except to balance the picture by introducing a small, dark value in a large area of light. It prevents the picture appearing one-sided.

20. In Fig. 3 is a tile roof that differs in treatment from Fig. 1 and gives the effect of a nearer view. The heavy lines used on the roofs *a*, *b* are made with slow strokes of considerable pressure. They present an effect of shadows, of courses of tile, which taken together give an agreeable dark value to the roof. Careful attention should be given the treatment of the stone blocks at the corner *c* and also to the suggestion of the wedge-shaped stones around the window *d*. None of these details is indicated sharply and clearly, yet an improper rendering of the direction of these lines, slight though it may be, would be a fault in the

drawing. One of the greatest difficulties of successful pen rendering is to know where to stop in the rendering of the characteristic details, and at the same time to give careful and sympathetic treatment to them.

In giving value to the stonework in shadow, the texture of the stone has been rendered by free, curving lines, and at the left of the rectangular window by a few irregular dots. But this method should be employed sparingly. The beginner should study magazine illustrations by well-known artists and observe how skilfully this dotting is sometimes used. It is introduced here simply to prevent the wall beyond the rectangular window from being an absolute white like the value on the end of the window. This window has lozenge-shaped panes; these are rendered black, the lead work being left white. In the pencil sketch that the student prepares for this drawing, the muntins must be drawn in, but the pen work concerns itself only with the values; the pencil lines are ignored except as limitations to the black panes.

21. The pencil sketch of Fig. 4 will show only the lines of the tiles, but the pen work by semicircular strokes will suggest the individual tiles. The introduction of these semicircular strokes is in conformity with the rendering of the flower pots in the plate entitled Introductory Exercises; the line of the shading follows as closely as possible the general outline of the object shaded. On the left side of the roof the details of the tile are not so fully shown, as, owing to a foreshortening, they are not so clearly seen, and the forms in this distant roof are inferred from the nearer one. As the left side of the roof approaches the hip at the corner, the rendering of detail is gradually omitted, leaving the value white. This accidental light emphasizes the effect in the drawing, in the same manner that the omission of the lines of the clapboards emphasized the drawing of Fig. 1. There is no marking on the side of the house to indicate it as stone, brick, or shingle, and it is safe to assume that it is of plaster or other plain

material. Were it built of large blocks of stone, they would be indicated by suggestions of the joints.

22. These few examples of roof rendering are sufficient to suggest modes of treatment for these and other textures whenever they appear. In the rendering of an old shingle roof the treatment would not be greatly different from that of Fig. 1. If the house were a new one, the lines would be more regular. A slate roof would require a still closer treatment in parallel lines, value being there the main consideration. Occasionally, all thought of texture may be laid aside in rendering a roof, especially in the case of the more distant parts. Such roofs may be rendered by a flat tone, the lines of which are generally in an oblique direction.

In rendering a building of any kind, about the first consideration is to determine where to place large masses of light and shade. It usually happens that the roofs present the best opportunity for this, coming as they do against the sky, which is generally left white. If the roof is of such a material or character that it is desired to leave it very light, it will sometimes be necessary to give the sky a cloudy effect, or better still to introduce behind the roof line a mass of foliage. A cloudy sky should generally be avoided in the rendering of an architectural subject.

In the rendering of all windows, small, dark spots should be introduced to avoid the appearance of desolation likely to arise from drawing them as black holes. Windows appear as black masses only when all of the glass is destroyed. When this is not the case the sunlight will play on the glass and muntins and give a varied effect. The texture of the glass can be suggested by introducing spots of light or of shade, or when the drawing is large, by showing dimly through the glass the curtains or other details inside. The mechanical elaboration of the window frame or sash muntins must be avoided if a total effect of sketchiness is desired. The true relations of light and shade are missed if too much attention is given to the accurate rendering of details.

23. In Figs. 5 and 6 are shown two windows that are characteristic of the ordinary type in American wooden houses. Their rendering is of a character consistent with the usual architectural drawing and expresses all of the details necessary for such work. Compare the different methods of rendering the blinds in Figs. 5 and 6—the first with the styles or side strips of the blinds left in white and profiled against the house by the shadow for an outline, and the second with the styles left black and the slats indicated by short, black lines. In Fig. 5 the left-hand and lower boundary line of the blind *a* is not shown but is indicated by the shadow cast against the house. A similar treatment is given the sill, but the blind *b* is outlined, except at the bottom where the shadow is shown.

This difference of treatment of blinds on the same window would at first appear unreasonable, but it should be borne in mind that we are not endeavoring to represent everything we can see but are concerning ourselves with the effect of the window as a whole. If the left-hand shadow of the blind *b* were drawn in, it would be found to interfere with the representation of the window sash, and the result would be lacking in clearness. Therefore, this shadow is omitted and merely the lower shadow that the blind makes against the house is introduced. These details must constantly be considered in choosing methods of expression.

It is generally advisable to define the outer sash of a window somewhat sharply. This is best done by indicating the shadows rather than the objects that cast them; Figs. 5 and 6 are good examples of this. The left and lower portions are defined by narrow, dark lines of shadow. In the lower half of these windows, the glass is shown dark, while in Fig. 5 the muntins remain light. In Fig. 6 there is no sash in the lower half of the window, and in order to prevent a square, black hole, a curtain is introduced hanging below the upper sash. In this figure, the shadows that would have been cast by the blinds have been entirely omitted, because the blinds themselves are so dark that the shadow would be confused with them.

The three windows shown in Fig. 7 are such as are usually seen in brick buildings. The treatment of each is slightly varied from that of its neighbor, but as a whole they present a uniform appearance and are plainly of the same type. In the rendering of a modern business building we usually have a large number of windows to represent, and this presents a difficult problem. In form each window is a repetition of the others, but the light and shade should vary. In Fig. 7 the direction of the light is assumed to be the same as in Figs. 5 and 6.

The greatest difference between the windows of a frame house and those of a brick or stone building is the difference in the thickness of the walls. Study carefully the treatment of the soffit, or under side of the lintel above, and the reveal at the side of each window. It is a good rule never to introduce more than one large, dark spot into a window, and as the three windows are here treated together, only one considerable spot has been used in the entire group. This occurs in the lower part of *a*; a lesser spot is introduced in *b*, while to vary the effect the medium-sized dark spot used in *c* occurs in the upper part. The half tones are introduced into each of the windows to soften the effect of the spot and add to the glassy appearance.

Fig. 8 shows a more ornamental type of window. There is nothing here essentially different from the previous examples except the careful suggestion of ornamental detail by the drawing of the shadows. Outline in the details has been avoided as much as possible, except in the window frame where some of the horizontal elements are shown in the upper part. Here the lower panes are shown dark, but they come so close together that they appear in composition as one spot.

The triple window in Fig. 9 is from an English country house. Diamond-shaped panes set in lead are characteristic of this architecture, and the way to render them has been spoken of in connection with Fig. 3. Here, however, the treatment is more complicated. Note that the effect of the window is sometimes introduced by making the panes black, and in other parts the pane is left white and the lead work

drawn in. This gives variety and expresses both the transparency of the glass and the reflection of the sunlight from it. Under the foliage, in places, the deep shadow obscures all the details. The mullions between the windows must be suggested very slightly but not carelessly. Sketchy as this detail appears, it requires more careful pencil drawing than any of the previous examples.

Figs. 10 and 11 are entrances to New England houses. The suggestive treatment of panels in Fig. 10 should be noted, and also the free lines used in outlining the vine. Little of the vine is expressed, except on its shadow side where an even tone indicates its under surface. In this sketch the light falls from a different direction than in the previous ones. In Fig. 11 the shadow is shown by cross-hatched lines immediately under the roof. This is the only case in this plate where cross-hatching has been used for a shadow, but here the depth of the shadow and the projection of the roof are best rendered in this manner. The shadows on the columns and other architectural details are rendered as simply as possible.

24. In architectural rendering it is necessary to introduce various accessories in order to break the monotony of line that is apt to occur, and to add life and interest to the subject. The principal ones are: masses of foliage, such as trees, shrubs, and vines; horses and carriages; and figures, according to the location and surroundings of the object represented.

Figs. 12 to 15 are illustrations of typical foliage. In the introduction of tree forms, there are two important considerations: first, the determination of sizes, what general shapes, and what values should be used in the composition in order to establish a balance and maintain a rhythm, and at the same time preserve harmony between the appearance of the building and the forms of the masses with which it is surrounded; second, it is important to introduce only such types of growth as would naturally be found in the locality of the building.

If the drawing is from a photograph of a building that already exists, some minor objects may be changed in form. It is quite proper to enlarge or curtail or vary the outline of a tree or vine. Such changes would not falsify the general appearance. Neither need one feel bound by the actual values indicated in a photograph. As a matter of fact, a photograph seldom renders values with any degree of accuracy. The high lights are usually brighter and the shadows deeper and more opaque than they appear in nature. They need to be adjusted when reproduced in pen-and-ink rendering.

If the building is not yet erected, much more freedom may be used and the choice of such accessories as shrubbery, trees, etc. may be governed entirely by good taste.

Fig. 2

Fig. 3

In Fig. 12 is a very light treatment suggestive of the upper part of a group of poplar trees, the lower part being hidden by low masses of foliage. The character of the poplar is so marked that it cannot be mistaken if only the outline is well indicated. This is characteristic of a number of trees, as is shown in Figs. 2 to 5 of the text. However, where trees grow near together or are seen at a distance in masses, it is not easy to distinguish the different kinds.

In Fig. 2 of the text is shown the general character of the outline of the poplar as it should be drawn in pencil before the rendering shown on Fig. 12 of the drawing plate is attempted, while in Fig. 3 of the text is the characteristic

outline of the apple tree. The oak shown in Fig. 4 and the American elm shown in Fig. 5 of the text are further examples, and their characteristics should be studied by the pen draftsman if he would properly indicate them.

Fig. 4

In rendering these trees the outline should be drawn in pencil and not inked. The mass of foliage, if the trees are distant and unimportant, should then be laid in in an even tone, the lines of the pen running as nearly as possible in the direction of the lines of the foliage; but where the trees are nearer and a more careful rendering is desirable, the tones can be varied, as in Fig. 12 of the drawing plate, and strong, high lights introduced to give life to the composition.

In Fig. 13 is shown a mass of foliage that might be used as a background at the side of a house, or in some place where a dark spot is required in the composition. In Fig. 12, the color values of the trees are not given and no outlines are used; only the shadows are touched in by the use of short lines that help to give the effect of leaves. The absence of outlines gives the effect of air and sunlight,

Fig. 5

for the constant moving in nature prevents our seeing any distinct outline. In Fig. 13 an outline is shown, but note how the effect of the dark mass is softened by the addition of the finer and very irregular lines. In this case the atmospheric effect is helped by the outer lines, for if the broad, dark strokes that make up the strong value of the trees were left at the edges the result would be hard and crude. Where a dark tree appears against the sky the edges appear lighter than the mass of the tree. Touching the edges of the dark masses with lighter tones or outlines is an attempt to suggest what is true in nature.

In Fig. 14 is shown a loose and free treatment often needed in the suggestions of foreground study. There are infrequent occasions when the immediate foreground may require a detailed representation of trees, at which time a few should be carefully drawn. One or two well-defined and shaded leaves backed by several small masses of shadow will express much more than a number of poorly rendered details.

Fig. 15 is a young maple tree represented entirely in shadow. The trunk should be drawn with great care, giving a proper sense of strength and vigor. Note the gradual diminution of its size as it leaves the ground, so that it is smallest immediately under the burst of the foliage. All saplings are of this general type—elms as well as maples. These are appropriate trees to introduce into the foreground of a building in a newly laid district. The young tree is in harmony with the development of a new or young district, and the small mass of foliage at the top of the tree does not interfere materially with the view of the structure.

25. It is necessary to study nature constantly. Make sketches from photographs, or from actual trees, and practice in the rendering of these accessories. A collection of these sketches is part of the stock in trade of every draftsman and every illustrator. In sketching from nature always look for large masses and characteristic lines, as this will give a freedom of rendering and touch. Sketch any object that interests you; do not imagine that you can draw it from memory when

wanted. A visit to any artist's studio will convince you that none of his illustrations or pictures are made from memory. Thousands of sketches and bits of detail are recorded by him from time to time to be laid out as notes from which to build up his finished study.

There should always be more freedom and lightness of touch in handling natural forms than in handling architectural forms. The contrast gives interest to the picture. The addition of figures adds interest and serves also to give scale to the other objects, because one compares heights to the size of persons; but a good picture may easily be spoiled by the introduction of badly drawn or badly placed figures. In other words, a good composition can be spoiled by introducing figures that destroy its effects. In the case of trees and foliage, or of people, they should be such as would be found in the neighborhood of the buildings shown. Of course, almost any kind of a person might happen to be in front of any building, but that is not considering harmonious composition. Introduce only such individuals as would be likely to be seen there. A procession of soldiers would not be a proper element to introduce into the foreground of the drawing of an old monastery, any more than a procession of monks in the drawing of an armory. In the same manner, Fig. 17 would not be proper in connection with the old English cottage. In the composition called An American Country House, it would not do to introduce a street sweeper, such as is shown in Fig. 21, and which would take its place quite appropriately in connection with a city building.

In introducing figures in a picture, composition should always be the first consideration. Figures must always be considered as spots of value and must be so placed that the balance of the picture will not be destroyed.

26. The laws of perspective must be kept constantly in mind, as a figure out of scale will destroy the effect of the entire composition. A person of average height standing on a street level, will find that the heads of the people about

him—whether near by or far away—will appear at about the same level as his own. The more distant figures appear smaller than those near by, but the diminution in height is entirely at the foot-end. Their heads are always on a level with one another, as shown in Fig. 6 of the text.

Figures should appear in natural attitudes when grouped about a building, and when standing still should be engaged

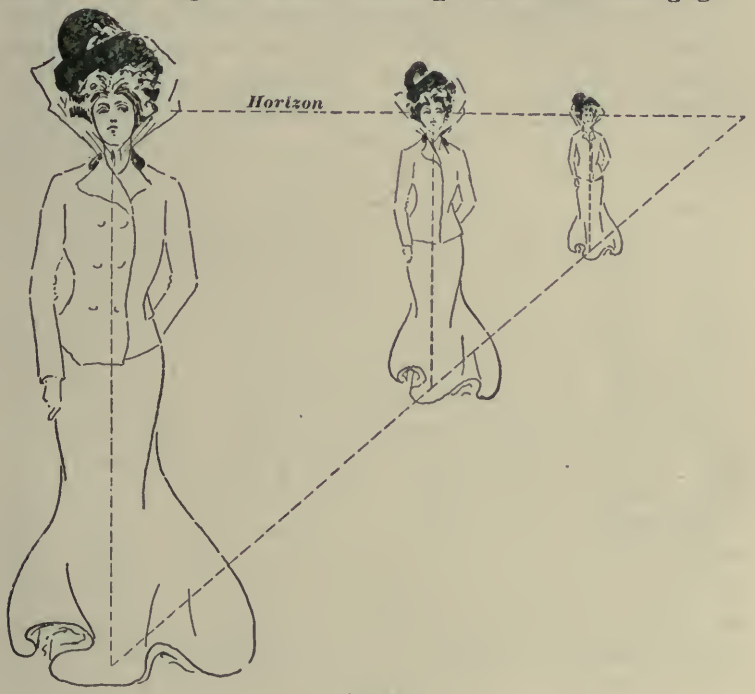

Fig. 6

in conversation. At least some excuse for their standing still should be obvious; otherwise, they will appear like dolls. The majority of figures that we see outdoors are moving, and snap-shot photographs will give a series of them.

27. Figs. 16 to 24 suggest the kinds of figures that will appear most useful; they also show the methods of rendering such figures. No small details are shown. Features are simply suggested or indicated, and in one or two cases

not indicated at all. Only in Fig. 16 are such details as buttons indicated, and in this case they are necessary, as the large brass buttons on the coachman's coat are suggestive of his character. In sketching figures, either from nature or from photographs, work only for the long lines and the larger forms.

The key to the proportioning of the figure is the head. The first question to be settled is the number of heads in height to be given a subject. The size of the human head varies but slightly in different individuals, and there is less growth of the head from infancy to adulthood than in any other part of the body. In adults the length of the head constitutes from one-sixth to one-eighth of the whole height of the person. A figure but six heads high looks short, as shown, for example, by the woman in Fig. 16 of the plate, where the head is about one-sixth of the whole height. The actual height of the coachman, exclusive of his silk hat, is about that of the woman, but he gives the impression of being much taller. His head, allowing for the part covered by the hat, is about one-seventh of the total height.

Fig. 17 gives the impression of being a tall woman, and you will find her to be about seven heads in height. Compare the sizes of the heads in Fig. 22. While they are not very different in size, the little girl is about five and one-half heads in height, and the woman is nearer eight heads, which is very tall. A figure should never be made over eight heads in height, unless it is desired to give the appearance of unusual height to the person so represented.

Care should be exercised in sketching figures to avoid the appearance of their toppling over. If a figure is standing so that it is vertical, a line should be drawn from head to foot which should show that the center of gravity is over the center of support. In drawing the head, consider it as an oval. Carefully mark the position of such parts as shoulders, elbows, waist, and hips. Refer the length of the arms to a point half way between the top of the head and the base of the feet. It will be found that the arm hanging by the side will fall below this center point.

The study of Fig. 7 of the text will help in the sketching of figures, where the heights in each case are divided into eight heads by the vertical line marked as shown. As figures recede into the distance, less and less of the detail appears, as will be observed in Fig. 19 of the drawing plate, where scarcely more than a few spots of light and shadow are indicated. While Figs. 16, 17, 18, 21, and 23 give some indications of color as well as texture, the other figures show hardly anything more than shadows, although in Fig. 22 the hair and stockings of the little girl and the hair of the woman are given a slight color value. In Figs. 18, 20, 22, and 24 the cast shadows are shown on the ground. In the others little

Fig. 7

of the light and shade is indicated, the color values giving the principal effect. This is in accordance with the principles observed in the shading of the girl in Figs. 1 and 2 of *Elements of Pen-and-Ink Rendering.*

While figures require as accurate drawing as any part of the picture, they must be rendered with a free, elastic touch; the T square and triangles are of no use here. The aim of the artist is to express life—the power to move—a contrast to the immobility of the architecture, with which they are often used as accessories.

In drawing the figures, the student may vary them to suit his fancy, taking his subjects from photographs or from

nature; but care should be exercised to follow the principles herein set down and to work as closely as possible in accordance with the foregoing instructions. The title may then be drawn at the top of the plate as before, and the name, date, and class letter and number inserted in their usual places.

DRAWING PLATE, TITLE: TYPICAL SUBJECTS

28. The work on this plate is devoted to four subjects, varying in character and illustrating the principles of composition and technique that have been heretofore set forth. The two upper studies, entitled In New England and In Old England, are drawn within rectangles 5 inches wide by 7 inches long, and set 1¼ inches below the upper border line and 1 inch from the side border lines. These rectangles may be drawn with the T square, but should be inked in freehand.

An outline drawing of the figures on this plate is shown on a separate sheet, and before he commences his rendering the student should copy it on his drawing plate. It is desired that he do this with the greatest care, for the pencil rendering must be most carefully executed in order to secure a satisfactory pen rendering.

The outlines of the New England farmhouse should be sketched in accordance with the details given on the outline plate, care being taken that the lines converge properly. In rendering this drawing, note that the principal dark mass of the foliage is at *a*, and is on the left and a little below the center of the picture. This is reenforced or strengthened by a larger mass of half tone that forms the end of the house. In rendering this half tone, attention should be given to the texture of the house; that is, the lines forming the half tone should be used to suggest the siding, or clapboards. This large half-tone surface attracts the eye first after the mass of dark at *a*, and the balance of the composition is maintained by the introduction of another small dark spot at *b* and by the half tone connecting the two spots. The spot at *b* is reenforced by the light gray of the sky.

The result of all of which is that the center of balance of all these spots of value falls about the center of the picture.

In this drawing five values are used, including white and black. These give a brilliancy of effect that is entirely free from harshness of contrast. The textures are in no way different from those practiced on previous plates. The sky as rendered here is an exception to what is generally considered good practice, for a tone is not advisable on what should appear to be the lightest part of the composition. In this case, however, the darkening of the sky is permissible in order to set off the roof and to form a background for that part of the composition, and to assist the perspective. The clapboards on the front of the house are only very faintly suggested, so as to give the idea of full sunlight on this side. The same treatment is given to the shingles on the roof, although no doubt is left as to the fact that the roof is shingled. A few touches are employed in the foreground to indicate long grass growing among the rocks, but no attempt has been made to render this in any detail.

Much can be learned from this drawing by studying the manner in which the darker parts of the picture have been connected with one another. The front of the house, being light, attracts the eye to the center of the picture, and this whiteness is further emphasized by contrast with the dark masses of foliage. The windows are merely indicated so as to prevent their cutting up the side of the house. The brick chimney is treated with only sufficient detail to show that it is brick. This method helps to convey the impression of oldness, which is still further intensified by the heavy growth of foliage, grass, and weeds.

29. In Fig. 2 is an old English farmhouse with thatched roof and timber construction, which shows through the brick filling on the end. The most difficult thing to render in this composition would be the foliage, but if the figure is carefully drawn in pencil after the model shown in the outline plate, the entire attention can be devoted to the rendering, as the drawing will have been completed in pencil beforehand.

In every case of pen rendering the drawing must be accurately worked out with pencil. Observe how much more complete are the text illustrations for the figures of this plate than are the finished renderings of the figures on the drawing plate The window openings, foliage outlines, and timberwork details are as carefully indicated in the text illustrations as though the drawing were to be finished with the accuracy of a photograph, but in the rendering a large percentage of these details is discarded. It is necessary, however, to have them before us when we start, in order to properly select those that are to be emphasized and those that are to be erased.

The effect of the dark mass at *a* against the sky is not softened by finer lines, but at the edge a fine line is used to relieve the abruptness of the heavier strokes. In sketching foliage in this manner, the roundness of the masses and the appearance of thickness must be suggested without any attempt to indicate the individual leaves. In the mass of foliage shown at *b*, the lines are much finer and more open than the ones used to indicate the nearer masses. This handling softens the effect and gives distance, or perspective, to the picture. The mass of foliage at *a* forms the principal dark spot of the composition and is contrasted against the light roof of the cottage so as to throw the latter into prominence. The harshness of this dark spot is relieved by blending it into the half tone of the nearer foliage, as well as by the middle tone indicated on the end of the cottage.

The values at the right of the picture are connected to those at the left by the small mass or line of shrubbery running along the fence and wall. The path *c* leads the eye from the lower left-hand corner of the picture through the gateway to the house. If this path or the foreground about it were carefully and elaborately detailed it would divert attention from the building, which in reality forms the center of attraction. The bulk of the cottage surface being white, this path also serves to connect the high lights; it should always be remembered that the various dark masses or the light masses should be connected together in order to give unity to the composition.

The treatment of the chimneys is here even less suggestive of brickwork than in the previous example, and in the end of the cottage between the timber beams the brickwork has been indicated in a broad and suggestive manner without expressing too much detail. The lines of the shadows under the eaves should be slowly and carefully drawn and accented at their lower ends so that they run together. These shadows do not end in an even line, but express by their uneven terminations the character of the thatch that casts them. The thatch on the roof is indicated by the fewest possible lines, but along the eaves and the gable it is so rendered as to convey the impression of great thickness. It will be observed that the extreme outside and corners of this picture have not been filled with any details. This method of treatment is called *vignetting;* it is used to keep the eye at the center of attraction.

One of the greatest difficulties in rendering a drawing is to tell when to stop. Experience only seems to advise the artist as to when he has worked enough, but the student should remember that as soon as the effect he has desired has been obtained, the picture is finished and every other line is unnecessary. It should be borne in mind also that the rendering of detail should be as sparingly used as possible. A well-rendered drawing, from a technical standpoint, is one in which the effect has been obtained with the fewest lines.

30. Fig. 3 is a view in the streets of the medieval town of Rothenberg, Germany. This requires very careful pencil drawing, according to details given in the outline plate. It is quite simple to render in pen and ink, as the tones are not complicated nor greatly varied. Here the darkest spot in the picture is near the center, a point to which the lines of the street naturally lead the eye. It is the shadow between the arch and is much smaller than the leading dark spots of Figs. 1 and 2. The comparatively large areas of half tones are so disposed that they practically surround the central part of the picture. This disposition tends to direct

the eye to the center of the picture quite as much as does the dark shadow surrounded by an area of light. The half tones on the left of the picture are formed by the shade side of the buildings, those on the right by the roofs. These roofs are rendered in simple half tones without any attempt to indicate their materials. They are probably tile, but the quaintness of the village street is so interesting in itself that one is satisfied without indications of the detail of either the roofs or side walls, except where it is necessary to give variety or to indicate structure, such as the arch stones suggest.

On the right of the picture, the combination of the figures in the foreground, the slight suggestion of a vine over the doorway, and the shadow of the eaves serve to break up the wide area of light and balance the composition nicely about the center. The introduction of these figures at this particular spot in the picture is of interest from the point of view of composition, and the small dark spot in one of the figures is interesting as showing how variety can be obtained by very simple methods.

The large area of light on the right-hand building needs a dark spot in the lower right-hand corner in order to maintain the balance, and the introduction of this group of figures with the particular values that they possess, is an excellent illustration of the right and proper use of figures as accessories. Simple and suggestive as the outlines of these figures are, their costumes are in perfect harmony with the quaint character of the place.

This drawing is so small that the treatment of the windows is of the crudest and most suggestive character, but the study of windows on the previous plate will show how to render them and to indicate the blinds, etc. that form prominent dark spots on the face of the building. Observe how slightly the buildings beyond the archway are indicated, and be careful not to give them too much prominence.

The face of the clock in the picture is carefully represented; not carefully detailed, but carefully suggested. No particular numerals are indicated and the hands are scarcely

more than hinted at, but one can easily see that it is twenty minutes after ten. This is of no importance whatever to the drawing, but it shows how much can be conveyed with a very few strokes.

In rendering this drawing, the student should be careful to keep his lines light and steady, and should be even more careful than in the previous cases not to overdo the rendering.

31. Fig. 4 is a perspective rendering of the Public Library at Malden, Mass. This presents the character of the average architectural problem in pen-and-ink drawing. Here is a stone building with a slate roof and accessory foliage to be rendered so that the material shall be indicated without being shown in detail. The use of lines suggestive of stonework or brickwork, as in Figs. 1 and 2, would give the appearance of age or antiquity, which is to be avoided. Neat, crisp strokes must be used, and the figures introduced must have an up-to-date appearance. Those used in the last example would be greatly out of place. Figures must not interfere with the lines of the building itself, but at the same time they must balance the composition. The rendering of the roof has been confined to the simple representation of a value by means of sharp, crisp lines corresponding in direction to the courses of slate with which it is covered. The windows and the arches of the porch require the greatest care. The former, so as to suggest the reveals, or thickness of the walls, and the latter to show the soffits of the arches and the deep shadow cast by them on the porch. Observe, in comparison with Fig. 1, the treatment of the grass. Few lines are used, but by their short, straight, and generally perpendicular position they suggest a mowed lawn. The stonework of the building is indicated by few touches at the angles and about the windows, without any attempt to outline individual stones. The darkest mass of the picture, the shadow of the arches over the porch, is near the center. The end of the building, in full sunlight, is relieved somewhat by

the suggestion of foliage just behind it, and the two figures in the foreground. Observe how the figures diminish in size as they recede from the eye, and that their heads are all at the same level, and that the spaces between them are unequal. All these details are of importance.

After rendering this plate, place the title in its proper position, and the name, date, and class letter and number below the border line as usual.

DRAWING PLATE, TITLE: DECORATIVE DESIGNS.

32. To a certain extent all drawings, good in composition and design, may be said to be decorative, but there is in general a distinction to be made between decoration and illustration. Decorative drawings in a book are for the purpose of ornamenting and enriching its appearance, rather than of giving information by the representation of facts. A decorative drawing may, it is true, have a pictorial motive, as is the case in Figs. 1 and 4, but it will be observed that neither of these are pictures such as we should make for purely illustrative purposes. Decorative drawings, therefore, are drawings of subjects that are so treated as to be of decorative interest first and of pictorial interest afterwards, whereas illustrative drawings are those that are intended primarily to convey a fact. This drawing plate represents a series of typical book decorations. Fig. 1 is a design for the front or cover; Fig. 2 is the back of the same book; Fig. 3 is the title page; Fig. 4, the heading for the first chapter; Fig. 5, an initial letter; and Figs. 6 and 8 florets, or printers' ornaments, introduced into the text occasionally for the separation of paragraphs. Fig. 7 is a tail-piece that may be used at the end of each chapter or at the end of the book, as may be required. This drawing plate of decorative designs is thus a series of drawings for a single book, to be used to decorate its pages and hardly at all to illustrate the story.

In designing the cover of a book, there is considerable scope in the choice of motives. In this case, landscape for

the front and floral form for the back have been chosen. The motive of the cover is a typical English village, with its cottage and adjacent buildings, trees and field, and a curving brook bordered by grass and flowers. The problem involved in such a design has for its chief consideration the satisfactory arrangement of the letters of the title itself, and the introduction of such masses in the pictorial part that the lettering and the picture will balance and form a harmonious whole.

A glance at Fig. 3 will show that the whole design has been kept light, and that the same kind of line has been used in the floral decoration as has been used in the lettering. In Fig. 1, however, the lines of the letters are much heavier than those in the picture below, and give an effect of weight or heaviness at the top. A heavy line is introduced into the pictorial design in order to make it harmonize with the lettering. The treatment of the landscape is extremely conventional. A portion of the trees are rendered in solid black, or silhouette, while others are in middle gray consisting of small oval forms indicative of leaves.

If this were taken literally the leaves would be of enormous size. In trees at this distance, the leaves could not be distinguished clearly. This means of indicating them is the frankest decorative convention. The same might be said of the bricks in the building and of the flowers and blades of grass, etc. These are indicated out of all proportion to their actual sizes, in order to secure a good rendering of this character. The sky and the water are likewise conventionally treated.

Consideration of light and shade do not enter so much into the grouping of this design, yet the dark masses are so disposed that the center of the balance is a little above the center of the picture. Bear in mind that the lettering is as much a part of this design as anything else and that in the general effect it constitutes a tone of about what we would call a middle gray; that is to say, the effect of the lettering is about half way between black and white.

In preparing this plate it should, like all the others, be

laid out in pencil, making the rectangle enclosing Fig. 1, $5\frac{1}{2}$ inches by 8 inches, and $1\frac{1}{4}$ inches from the upper and left-hand border lines. The inner rectangle containing the landscape on this book cover is $4\frac{7}{8}$ inches by $4\frac{1}{4}$ inches, and is located 1 inch above the bottom of the enclosing rectangle of the design. The upper line of the lettering is $\frac{5}{8}$ inch below the top of the enclosing rectangle, and the lettering is $\frac{3}{8}$ inch high with $\frac{1}{8}$ inch between the lines.

The lettering and general shape of the landscape should be carefully drawn in pencil. The details of the leaves, brick, grass, etc. should not be drawn in pencil, but put in with the pen. The solid black portion of the foliage should be rendered with the brush, but the rest of the work may then be executed with an Esterbrook bank pen.

33. Fig. 2, the back of the book, is 1 inch to the right of Fig. 1, and is $1\frac{1}{2}$ inches wide. The lettering on the back occupies the same space in height as that of Fig. 1, but the letters are only $\frac{3}{16}$ inch high and are spaced about $\frac{3}{32}$ inch apart. The letters at the bottom of the back, the lower line of which is 1 inch above the bottom of the book, are of the same size.

The floral motive used in the decoration of Fig. 2 is taken from the poppy. It will be observed how little attention has been given to the representation of the flower realistically. While the general character of the poppy has influenced the designer, his main object has been to execute an ornament suitable to the surface that is to be decorated. The space is tall; therefore, the ornament must be tall, and vertical lines must dominate its character. The small florets introduced with the lettering at the top and bottom do not compete in value with the letters, but harmonize with them in weight and help fill out the space. The form of these florets, though not identical, is similar to the general form of the flower or ornament used in the general design.

34. Fig. 3, representing the title page of the book, is a trifle smaller than Fig. 1, as the latter being the cover must extend beyond the pages. The space between Figs. 2 and 3

is $1\frac{1}{4}$ inches, while the width and height of Fig. 3 are each $\frac{1}{4}$ inch less than Fig. 1. The lettering at the top and bottom of the title page is enclosed in a rectangle $6\frac{1}{4}$ inches by $4\frac{1}{8}$ inches, placed 1 inch above the bottom of the page. The letters of the title on this page are $\frac{3}{8}$ inch high with $\frac{1}{8}$ inch between each two lines of lettering, excepting at the bottom, where the spacing is only $\frac{3}{32}$ inch. The letters at the bottom are $\frac{1}{4}$ inch high.

The floral motive on this title page is taken from an English wild flower and is in harmony with the subject, A Summer in Rural England. It should be drawn carefully in pencil, the central flower and stem being sketched first and the general lines of the decoration arranged about it. The left side of the design may be finished in detail and carefully traced off on tracing paper and transferred to the right side, so that both are identical in position. The stems should be drawn with T square and triangle, but the inking should be done freehand throughout. A No. 404 Gillott's pen is suitable for this exercise.

35. The chapter heading, Fig. 4, is similar in motive to the general design of Fig. 1. In width the design is considerably in excess of the width of the page, but it is customary to make designs for reproduction from one-half to two times the size of the finished product, as in photoengraving it will be reduced and the lines are therefore rendered much finer and clearer. It is not absolutely necessary that drawings should be made larger than they are to appear when printed, but in general practice it is found that a certain raggedness on the edge of the line detracts somewhat from the appearance of the drawing as an illustration, and as this raggedness can be obviated entirely by photographing the drawing to a reduced size, it is generally customary to take advantage of this mechanical method for eliminating this slight defect.

Fig. 4 is $\frac{1}{2}$ inch below Fig. 1 and $2\frac{1}{2}$ inches high, while in width it is the same as the cover. The lettering is a trifle larger than $\frac{1}{4}$ inch in height, and the inner lines forming the

rectangle enclosing the landscape and lettering are $\frac{1}{16}$ inch from the outside of the design, with a $\frac{1}{16}$-inch space between the rectangle of the design and the rectangle of the lettering. The general character of this composition is expressed in a number of horizontal lines, which is in harmony with the shape of the design. The dotted lines in the outlines of the cloud and roadway give a variety and a lighter treatment than could be obtained by a full line. The clouds themselves are important features of this design, but are very conventionally rendered. Without them the sky would present a dull monotint or a plain white, thereby throwing the picture out of balance.

36. Fig. 5, like Figs. 3 and 7, is a symmetrical design; that is, the sides are identical. The foliage and flowers of the poppy have been so arranged that they are in rhythm with the circular form of the letter. In decorating a surface, it is generally advisable that the lines of the decoration should be in harmony with the general outline of the surface to be decorated; that is, if the surface to be decorated is rectangular, then straight lines parallel with the most prominent sides of the surface should form the governing features of the decoration. Although this initial is rectangular a circular figure is its most prominent detail; therefore, the lines about the circle conform to the circular motive, while the straight stalk in the middle emphasizes the vertical feeling, and the corners are treated to harmonize both with the curved and the straight lines, thus giving harmony to the whole.

This figure is $\frac{1}{2}$ inch to the right of Fig. 4, and is $2\frac{1}{2}$ inches square. The sides of the inner rectangle containing the ornament are $\frac{3}{16}$ inch within the main rectangle. The circle outlining the letter *O* has a radius of $1\frac{1}{16}$ inches, and should be drawn in pencil with the compasses; while the inner curve of the circle is contoured with the compasses at the same radius, with the center $\frac{3}{16}$ inch to the right and left of the center of the outer circle. The general design should be sketched in pencil, and the left half carefully finished, then

traced and transferred to the right half, as was done with Fig. 3. The *O* may be inked with a brush, but the rest of the figure should be rendered freehand with a firm, steady, slow line.

Figs. 6 and 8 are placed directly under the outside lines of Fig. 3, on the same base line as Figs. 4 and 5. These are simple forms that should be drawn in pencil first and then carefully filled in with brush; the outlines are put in if necessary with the pen. The smaller leaves can be drawn entirely with the pen, by varying the pressure in order to produce a heavy or fine line, or swelled line, as indicated in some of the parts.

37. Fig. 7 is $4\frac{1}{4}$ inches by $2\frac{1}{4}$ inches. Here we have taken the wild rose—the national English flower—as the motive. A half tone in this design is secured by the careful veining of the leaves, while a dead black is inserted behind the rose as a background. This background gives a snap to the design and helps to define the outline. In sketching this, a center line should be drawn and the design worked about it. Then the left side should be finished carefully, traced off, and transferred to the right side. The entire drawing should be inked freehand, although the background should be laid in with the brush.

After completing this sheet satisfactorily, place the title at the top, $\frac{1}{4}$ inch below the top border line, in letters $\frac{1}{4}$ inch high, after which insert the name, date, and class letter and number in their proper places, as usual.

DRAWING PLATE, TITLE: WASH DRAWINGS

38. The rendering of this plate, although entirely different in method from any of the previous plates, is dependent none the less on identically the same artistic principles. The exercises on the previous plates in this Section were planned to furnish a training in the portrayal of *tone values* by means of lines drawn with a pen. Another method of securing the same result is by means of washes.

In wash drawing it is necessary, as in pen drawing, to use several values, and it should be remembered that these values should be produced directly; that is, one wash of the proper depth of tint should be used instead of several washes laid over one another. This direct method gives a snap and crispness to the drawing that is impossible to obtain by means of a series of washes. All of the principles of composition that have been studied apply in the same manner to wash drawing, but we have not to concern ourselves with the rhythm of line, inasmuch as our values are produced directly instead of by means of groups or hatchings of lines. Wash rendering, therefore, involves fewer technical difficulties than does pen-and-ink rendering, but it should not be inferred from this that wash drawing is easier than pen-and-ink drawing, for it has new difficulties of its own.

In pen-and-ink work the student was impressed that actual outlines did not exist but were expressed by means of tints or values, but it was found necessary in several cases to indicate outlines by an ink line. In wash drawing, however, we actually have no outline. In certain conventional renderings, such as Fig. 1, the outline is inserted as a part of the design, but observe in Fig. 2 the entire form is expressed by a series of values adjacent to one another without any individual outline being expressed.

It is possible to go much further in the expression of values in wash drawing than it is with pen and ink, but it seldom occurs that one need employ more than five values in order to express what is desired in his picture. In addition to the material used for pen-and-ink drawing, the student will here require a brush that will be used entirely for wash work, and which must never be used in the solid black inking that is used for filling in pen work. The brush should be about No. 6 or No. 7 and of good quality, so that it will possess elasticity and come to a point readily.

The medium, or material, in which this drawing is rendered is charcoal gray, although for some monochrome rendering sepia is used, occasionally tempered with a little

Vandyke brown or burnt sienna to lighten or deepen its tone. The washes for the plate may be mixed in an ordinary saucer, or a special water-color dish with several compartments. It is best to have two or three small dishes to contain the different washes representing different values, though after the student becomes experienced and skilled in the use of his brush he will be able to mix these values readily by adding more color or more water to the solution he has already prepared. The drawings should be executed on Whatman's or some other cold-pressed drawing paper, stretched on the board; this paper can be obtained ready mounted on heavy cardboard, and is sold under the name of illustrator's board. The blotter should be close at hand in order that the brush may be quickly dried, when occasion demands it, and a small, soft, wet sponge will be found exceedingly handy for wiping off a bad wash before it gets dry.

39. To draw Fig. 1, the student should make the enclosing rectangle $4\frac{3}{4}$ inches by $5\frac{3}{4}$ inches, and place it $1\frac{1}{4}$ inches below and to the right of the border lines. It indicates a simple treatment in flat tones of a still-life study, and contains five values including the white and the black. No attempt has been made to render actual light values, except where the small patches of white indicate where the strongest light falls on the objects. Observe how much can be expressed by the simple suggestion of these high lights, and study their location in still-life objects in order that they may be put in their proper places.

The best method of executing this drawing will be to make a careful drawing in pencil on another piece of paper and then carefully trace and transfer it to its proper place on the drawing plate that is to be sent in for criticism. This is advised because when washes are to be applied to the paper the surface must be perfectly smooth and even, and if much rubbing is done in order to correct the drawing the washes will not flow evenly.

The success in the rendering of this figure depends as

much on the accuracy and truth of the facts as on the smoothness of the washes; truth in values can be obtained only by painstaking care, in experimenting with each wash and matching it carefully with the scale of value desired. Reference should be made to the scale of five wash values that has been made, and the tones in Fig. 1 arranged to correspond. Smooth washes can be obtained only when the wash is laid rather quickly and spread over the surface evenly, before any portion has had an opportunity to dry. The board should be held in a slanting position toward the worker, and the wash begun in the upper left-hand corner and carried down from left to right. When the wash is completed and the surplus color has reached the lower right-hand corner, the brush should be dried on the blotter and the point applied to the wash to absorb the superfluous moisture. Care must always be taken that one wash is thoroughly dry before the next one is laid beside it, otherwise they may run together; sometimes it is desirable to have them do this. The dark outline in this figure is executed, after all the rest of the work is done, with the brush held so that it is perpendicular to the surface of the paper.

40. In Fig. 2 the problem is more complicated, because the expression of light and shade is added to that of the color value and the shades are graded and vignetted into one another. In applying the wash to this drawing, the principal object should be considered first; that is, the silk hat. First, lay the light gray wash inside the band, leaving the patch of white where the high light falls. When this is nearly dry add the middle value to the rim and the ribbon and down the high light of the crown. Before this latter is quite dry, the deep black should be applied so that it will spread into it slightly and not produce a hard line where the high light and the dark portion come together. If there is a tendency for the black to spread too much, it is a sign that the half tone is too wet, and the tendency to spread may be lessened by touching it slightly with the edge of a piece of blotting

paper. The rest of the crown should now be laid in, and the very slightly reflected lights on the side of the hat may be produced by absorbing with the blotter the excess of color that gives the deadness of tone. The softening of washes at the edges, where such is desirable so that a dark tone may gradually blend into a light one, is usually effected by rinsing the brush in clear water and then gently drawing it along the edge of the still wet wash that is to be softened. In this way a dark tint may be gradually washed down almost to pure white.

Another way of vignetting the dark tint into the light is to wet the paper with water before the dark tint is applied. Where a light gray tint is to be washed into a lighter tint this is the best method, because the entire surface may be moistened with clear water, and then the gray tint worked into the center of it wherever desired, and the edges afterwards softened off so that the line of demarcation between the white paper and the gray tint is utterly unobservable.

41. Fig. 3 is a small sketch of part of one of the California Mission Buildings. The only new thing in this figure is the rendering of the foliage, which is extremely crude and suggestive. The principal object is the tower and dome, which should be drawn first. There are two shades of gray on the sides of the dome, and the windows are one tone darker. In rendering the foliage, begin with middle gray and soften it at the edges where necessary in order not to make it too harsh. The black on the poplar tree should be added while the middle gray is still moist, in order that it may spread and produce a soft effect at the edges. The slight suggestion of outline around the dome of the tower and along the eaves and string courses should be introduced in order to preserve the architectural effect of the building, in contrast to the sketchy foliage.

42. Fig. 4 is a problem similar to Fig. 3, but slightly more difficult. The two sides of the pyramids are expressed in two tones, and the other details of the landscape are rendered in tones that give them contrast and variety of

effect. This figure should be studied carefully and rendered according to the principles described. There is nothing in it differing from the preceding problems. When complete, draw the border line, place the title $\frac{1}{4}$ inch high and $\frac{1}{4}$ inch below the upper border line, and then insert name, date, and class letter and number in their usual places.

This completes the Course of study on rendering with pen and brush, and the student has had placed before him all the principal problems that arise in this class of work. The making of a few drawing plates and the studying of a few principles, however, will not make an artist of him, and he will find it advantageous and necessary to draw constantly objects that he sees around him and to render both in wash and in line drawings such objects as he may find time to study. This practice, together with a careful criticism of his work on general principles, will assist him greatly and enable him soon to go about and make satisfactory drawings of the various subjects he desires to see portrayed.

ELEMENTS OF WATER-COLOR RENDERING

INTRODUCTION

1. Purpose of this Section.—This Section will give the student a practical working knowledge of painting with water-color pigments so that he may properly render illustrations, designs, or architectural drawings. The importance of such a training will be pointed out later. The student will be taught how to study as well as what to study, and by means of a number of definite lessons, that will teach him how to render certain objects, he will be trained to render other objects by the development of his color perception. The Course here given is identical with that of the leading art schools, where the instructor gives directions to the student as to how work shall be executed and criticizes it when it is completed. Each illustration used in this work, except certain color charts, has been made by a student during the progress of a similar course of study, and expresses therefore the impression a student receives from his instruction during the progress of his work rather than the theoretical idea in the mind of the more experienced instructor.

2. Necessity for a Training in Color Work.—At the present day efforts are made in the kindergarten and primary schools to teach children the proper perception and appreciation of color and to develop their color sense. The results of this teaching in the next few years cannot be predicted; even now these children far outstrip

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many of their elders in knowledge and comprehension of the theory of color and ability to see color in all things. One future result of this will be that the illustrator, the designer, or the architect, that is not familar with modern truths concerning color and persists in following an old and antiquated system of coloring, not according to theory but according to certain ancient formulas, will find himself set aside and replaced by the man of individual perception. The child in the school of today is likely in 10 years from now to be practicing in one of these crafts or professions, while the craftsman and professional of today will still be engaged in his same line. It is not difficult to predict that this early education in color will make the younger man the more skilled craftsman of the two.

The illustrator will feel this quite as much as any other artist, inasmuch as the increased demand for colored reproductions has caused an increase in methods of reproducing color, and the illustrator of the near future will necessarily be called on to express his compositions in color far more frequently than he does in the present day.

This present Instruction Paper is the first one of this Section. Its purpose is to acquaint the student with color theory and to train him to handle the brush and water color pigments so that he will understand and overcome any mechanical difficulties before getting at the actual work of painting objects, landscapes, etc. Upon the completion of the required work (see page 17) of this Instruction Paper, the student will be ready to proceed with the work of the other Instruction Paper in this Section, entitled "Rendering in Water Color."

THE THEORY OF COLOR

COLOR PERCEPTION

3. The Sensation of Color.—What we call *color* is the sensation or impression produced upon the optic nerve by the number and character of the rays of light that are not absorbed by, but are reflected from or given out by, the surface of an object. For instance, if an object be painted with a certain pigment which makes the object appear to us to be yellow, this means that the paint has the property of absorbing and retaining all the colored rays of the spectrum (to be described later) except the yellow rays; the yellow being reflected to our eye.

Few individuals are capable of appreciating the existence of all the colors in nature. The brilliant hues of flowers, the deep greens of trees, the deep blue of the ocean, and the azure of the sky are evident to nearly every one, but to the majority of persons uneducated in art or color such objects as pieces of coal, old iron, or ordinary street mud appear devoid of color and utterly black, while white-muslin garments, etc. appear white without tinge of color at all. As a matter of fact, these are not the conditions; blackness exists only in absolute darkness, and where there is light there is color.

Color perception is purely a matter of cultivation. The power to distinguish between the bright colors of red, blue, green, etc. is usually developed in early childhood so that, like speaking, or reading, it seems perfectly natural. But the method of teaching color to children is usually very crude, for while the average boy or girl can tell readily the difference between bright green and bright blue, few of them can distinguish between a bluish green and a greenish blue.

Green being composed of blue and yellow will change in its hue according to the predominance of blue or yellow in its composition. A proper mixture, we assume, will make pure green; an excess of blue will make a bluish green; an excess of yellow will make a yellowish green. These slight differences must be studied and the eye must be cultivated to appreciate them.

Ask a child the color of an old horseshoe lying in the street and he will tell you that it possesses no color; coal is black, and so is mud, to his untrained eye. This inability to perceive certain colors should not be confused with color blindness, which is a disease or freak of nature that can rarely be cured. It is simply color ignorance, which can be overcome by study, as any other lack of perception can, according to the amount of attention that is given to it.

The ancients understood the use and application of color and made very subtle combinations of it in their decorations, but for centuries the theory of color has lain dormant. Within a comparatively few years, however, color as seen in nature has begun to seriously occupy the minds of artists and teachers, and its fruits are visible in the growing demand of the public for color and the striving for mechanical methods of reproducing color.

CLASSIFICATION OF COLORS

4. The Spectrum.—What we ordinarily term the spectrum, in connection with color work, refers to the solar spectrum, i. e., the spectrum obtained from a ray of sunlight. In reality, the solar spectrum is a continuous horizontal band of light, consisting of short vertical bars of the different colors, which results when a ray of sunlight is allowed to pass through a glass prism.

In such a band of light, or spectrum, there are seven distinct colors noticeable, namely; violet, indigo, blue, green, yellow, orange, and red. From this, we have been led to call any collection of these seven colors, whether of colored lights or of colored pigments, *the spectrum*. It is with this solar spectrum, i. e., the seven colors into which a ray of sunlight

is resolvable, that we are concerned in doing water-color work.

5. Primary, Secondary, and Tertiary Colors.—Conclusions as to what are the **primary** colors of the spectrum have been repeatedly altered with the progress of scientific investigation. Newton called the entire seven colors primaries. Later, Sir David Brewster performed experiments from which he concluded that red, yellow, and blue were the primaries. Then Prof. Maxwell announced that the primaries are red, green, and blue, from direct examination of the rays. The most recent investigation results in the conclusion that red, green, and violet are the simple, or primary, colors; for the reason that none of these colors can be resolved into any other colors.

The above conception of the primary colors, it must be remembered, refers to colored *lights*. In the popular conception, and as applied to colored *pigments* (with which we work when doing water-color painting), the primary colors are **red, yellow,** and **blue;** because pigments of these three colors, in combinations of various proportions, will produce every other color of the spectrum.

The **secondary colors** are those composed of two primaries, and are **green, orange,** and **violet;** they vary in hue according to the proportion of the admixture of the two colors composing them; whereas, the primary colors are standard and do not vary. A mixture of two secondary colors gives us what we term a **tertiary color,** or one composed of four primaries. This may seem somewhat obscure at first, inasmuch as we have but three primaries, but in a tertiary color some one of the primaries must exist twice. If we mix the secondaries, green and orange, we will get a tertiary color called **citrine** in which there is nearly twice as much yellow as there is of either of the other primaries, and while it contains nothing but the three primary colors it is in reality composed of four ingredients. In like manner, if we mix the secondaries, orange and violet, we get the tertiary **russet;** and if we mix violet and green we get **olive.**

POSITION OF COLORS IN CHROMATIC SCALE

6. Blue and Yellow.—If we adopt a **chromatic scale**—a scale wherein the various colors are related to one another in the same manner that the various degrees of light and shade are related to one another, that is, from most brilliant sunlight to absolute darkness—**blue** will be nearest black or darkness. That is to say, blue is the least obtrusive of all colors, and when used in a design or decoration is the least conspicuous. Blue bears exactly the same relation to absolute darkness or black that yellow does to brilliant light or white; the palest tint of **yellow** is nearly white, the darkest shade of blue (**indigo**) is nearly black. Yellow and blue, then, will occupy the extreme ends of our color scale, and all other colors will be arranged between them in the order of their brilliancy or obtrusiveness.

7. Red.—The position of **red** in the chromatic scale is midway between yellow and blue, it being intermediate between white and black or between light and shade. Hence, red has a double power in its mixtures, for by union or mixture with yellow it becomes a warm and conspicuous color, but combined with blue it recedes and becomes colder and retiring. It is preeminent with all colors, forming with yellow the secondary color orange and its close relatives scarlet, etc., and with blue the secondary purple with its allies violet, crimson, etc. It gives warmth to all colors, but particularly to those that already possess a proportion of yellow to some degree.

8. Orange.—Of the secondary colors the first in relation to light and warmth is **orange.** Such a compound of red and yellow as will, in an equal quantity of either surface or intensity, neutralize a perfect blue is termed a *perfect orange.* The term *neutralize* means to offset completely in intensity or prominence. The proportions of such a compound are very important and consist of five parts of perfect red and three parts of perfect yellow. An increase of red causes the color to approach scarlet; an increase of yellow

causes it to approach a lemon yellow. A mixture of orange with green forms the tertiary color called citrine, and with violet it produces russet.

9. Green.—In the general scale of colors, **green**, so far as relation of light and shade is concerned, occupies the middle position, but in the secondary colors it is second. It is composed of the extreme primaries yellow and blue. A *perfect green* consists of three parts of yellow and eight parts of blue in equal intensities, and will neutralize a perfect red in the proportion of 11 : 5. Of all compound colors green is the most effective, distinct, and striking, and contrasts beautifully with the other primaries and secondaries; it is the most abundant color found in nature. Mixed with orange it produces the tertiary citrine, and with violet the other tertiary, olive.

10. Violet.—The third and last of the secondary colors is **violet**, composed of five parts of red and eight parts of blue, and will neutralize a perfect yellow in the proportion of 13 : 3. With green it produces olive, and with orange, russet. It is the coldest of the secondary colors and nearest black in respect to light and shade. It is a receding color and possesses many of the qualities of blue in this respect. Next to green, violet is the most pleasing of the contrasting colors.

These seven colors constitute the entire gamut or chromatic scale with which all tints and shades are represented. If we consider a color scale beginning with the palest yellow and ending in the darkest blue, we have the extremes of light and dark producible by pure color. If we have another scale, beginning with the purest white and ending in the deepest black, we have the extremes of light and shade producible with white light that is not broken up into the spectrum colors.

PROPERTIES OF COLORS

11. Hue.—**Hue** is that property of any color that characterizes it as *a color* instead of as a black and white value. As we look into a camera the image seen on the ground glass shows the landscape, the floral group, or whatever it is, just as it looks to the eye—that is, with all its colors *and* its light and dark values. But the photographic print of the very same landscape or floral group shows everything in the picture in only black and white values. That which appears on the ground glass but is absent from the photographic print is **hue.**

If we add to a certain color a small amount of another color, as for instance adding a little yellow to red, we get what is known as a **change of hue.**

12. Tone.—**Tone** is that property of any color that distinguishes it from other colors (or from certain varieties of its own color) in the respect of its approaching or receding from black; in other words, that which shows whether it is darker or lighter.

If we add black to a certain color we make it darker; if we add white (or, in the case of water color pigments, if we add water) we make it lighter; in both cases we produce what is known as a *change of tone.*

Light tones of any color (that is, those approaching white) are called **tints,** and dark tones (that is, those approaching black) are called **shades.** The student should familiarize himself with these terms, as they will be referred to frequently.

13. Warm Colors and Cold Colors.—A **warm color** is one in which there is a predominance of yellow. Examples of warm colors are yellow, orange, yellow-red, orange-red, etc. A **cold color** is one in which there is a predominance of blue. Examples of cold colors are blue, violet, blue-green, etc. Warm colors and cold colors produce in one the mental sensations of warmth and coldness respectively.

14. Value.—The term **value** is applied to the relative amount of light reflected by the different colors, the strong

values being those that approach white on one side and black on the other. For example, in some object there may be as many as six tones of color—three grades in the light and three in the shaded portion. The high light will have the strongest value in the lights, and the deepest shadow will have the strongest value in the dark portions. A correct rendering of these comparative values is essential to the proper representation of any object, as will be explained as we proceed.

15. Positive color is the pure determinate color that may be produced with a strong wash of any one of the primary or secondary pigments; that is, the clear color as we have it in our color box.

16. Local color is a term applied to denote the general color of an object without reference to the accidental effect produced by light and shade, distance, or the reflection of other colors. For instance, the foliage of a tree is green in its local color, but in the reflected light of a sunset it may be golden brown; distance may render it a bluish tinge, and atmospheric conditions may reduce it to a neutral gray. Thus, we see that the apparent color of an object may be quite different from what the local color would indicate.

17. Complementary colors are those that, by their union, will theoretically produce white, or neutral gray. It is impossible to produce pure white by a combination of pigments, but it is possible to produce a dingy white or neutral gray by a mixture of all the spectrum hues in pigments, either individually or through the secondaries. Thus, the secondary colors become the complementaries of the primaries, inasmuch as by mixing any secondary with its opposite primary we have, to a certain extent, the elements that go to make up all the colors of the spectrum. For instance, as red and yellow make orange, red and blue make violet, yellow and blue make green, etc., we have by a combination of red, yellow, and blue all of these six colors. Therefore, the complementary of any one of the primary

colors will be the secondary color that contains the other primaries. Green thus becomes the complementary of red, violet of yellow, and orange of blue.

Carrying this theory down more exactly, blue-green becomes the opposite of orange-red, reddish blue the opposite of green-yellow, and red-orange the opposite of green-blue. As the red pigment leans toward yellow, thus becoming slightly orange, its complementary color—green—becomes bluer in order to compensate properly. As the red pigment approaches blue, its complementary color—green—takes on more yellow in order to offset the blue that is in the red, as there is already sufficient blue in the green to compensate the plain red; and so it is with all the other colors and their opposites, and we can thus obtain the complementary of any color with sufficient accuracy for all practical purposes in painting.

18. **Contrast** is a term applied to the effect produced when two or more colors, or different tones of the same color, are placed next to each other. There are three kinds of contrast—contrast of tone, contrast of hue, and contrast of tone and hue. Thus, the combination of a tint and a shade of the same color will produce a contrast of tone, as shown in Fig. 4 (*q*); a combination of two distinct colors of the same tone will produce a contrast of hue, as shown at (*r*); and a combination of opposite colors, one of which is light and one dark, will produce contrasts of both tone and hue, as shown at (*s*).

When colors of different natures are placed next to one another, they have the power of mutually affecting each other with their complementary colors. Thus, when red and green are placed together they each appear more intense; when a neutral color is surrounded by a positive color the neutral color becomes tinged with the complementary color of the positive; that is, when a gray is surrounded by a red the gray appears tinged with green, that being the complementary of red. This is called **simultaneous contrast**, and can be studied in Fig. 4 (*b*), (*c*), (*d*), and (*e*), where four

rings of neutral gray are surrounded by four positive colors, each of which appears to change the color of the ring to a certain extent. This change of color may not be apparent at first, but a careful study of the four rings will show a difference, and by closing the eyes slightly, or viewing the rings through a piece of tissue paper, the decided tone of the complementary color will make itself apparent. Thus, the ring surrounded by crimson has a tint of slightly bluish green when compared with the others, while the one on the violet appears lighter and somewhat yellow. The ring on the green appears tinged with a bluish red, while that on the yellow appears decidedly darker and tinged with a reddish blue. It is difficult for the average student to realize that the four rings are exactly the same tinge and hue and that this apparent difference in color is simply effected by the force of contrast.

In like manner, as before stated, there can be simultaneous contrast between two *colors;* thus when blue and yellow are placed next to each other the blue affects the yellow with a yellowish tinge that is much brighter and more intense than the yellow itself; and we have thus an increase both in light and in saturation. The yellow on the other hand tinges the blue with a more intense blue, and a mutual increase in brilliancy is the result.

This explanation of simultaneous contrast is given, not merely as an interesting property of color, but to prepare the student to use the proper colors when painting objects, drapery, landscapes, etc., particularly when portraying shades and shadows. The shaded parts of an object, as well as the shadow cast by it, are parts that receive very little illumination. To the untrained observer they may appear a neutral gray; but, after the student's color observation has been trained, he can see that these shaded portions and shadows become tinged with the complementary of the adjacent positive color—which is an effect of the law of simultaneous contrast. For example, a shadow cast on a stretch of yellow-green grass appears tinged with a reddish hue, red being the complementary of green.

19. Shade and Shadow.—Shade is produced by varying the degree of light. If an object is equally illuminated on all sides it possesses no shade side, but where the light falls upon it from one direction some parts of it are illuminated more than others and there is a light side and a shade side. If opaque, the object interferes with the passage of light and casts a *shadow*. Shadows vary in degree from a slight diminution of the power of the direct light to utter darkness.

20. Artificial Color.—The only method that we have of producing the sensation of color with any degree of permanency is by means of pigments or dyes. If we stain a piece of paper or fabric with a certain dye, or if we paint on its surface with a pigment, we produce on that paper the sensation of a given color. This is due to the fact that the pigment or dye has the chemical quality of absorbing all the color rays that compose the white light except the particular color that it reflects back to the eye, and thus produces that sensation. If we paint on the paper with red and set it in the light, we know that the pigment is absorbing the violet, indigo, blue, green, yellow, and orange rays and is reflecting back to the eye only the red; hence, the sensation of red.

MATERIALS AND METHODS OF WORK

21. Materials Required.—With the exception of the paper, all special materials such as water color pigments, color tray, and brushes needed by the student are sent to him. Thus his outfit of materials is already supplied; and all he needs to do is to procure the articles spoken of in Art. 25 below, which, together with his drawing board, thumb tacks, etc. (that he already has on hand) will fit him for starting with the work.

22. Pigments.—The following pigments have been selected for this work, and since the originals of the color plates and illustrations in the text have been made with

them, the student can be sure of getting similar results. The pigments in the color box provided are, from left to right, crimson, orange, gamboge, Hooker's green No. 1, new blue, burnt sienna, yellow ocher, Hooker's green No. 2, charcoal gray, Vandyke brown, Prussian blue, and Indian red.

23. Brushes.—Three brushes will be found sufficient; two red sable brushes, No. 3 and No. 6, for washes and details; and a small bristle brush for scrubbing out high lights.

24. Paper.—Whatman's C. P. (cold pressed) white drawing paper (sometimes called "water color paper") should be used. Never use a paper with a smooth glossy surface, or one that is tinted, such as yellow or buff; always specify **white** paper when ordering.

25. Additional Materials.—Certain other materials will be found useful, and can be obtained with very little cost. They are as follows:

Drawing pencils for properly sketching in the work, and a sharp **knife** to keep the pencils well pointed; **water glasses,** one for containing clear water and one for water in which to rinse the brushes; **sponges,** one for "washing out" color work, and one for cleaning the paint box (which should be done frequently); **white blotters** for taking up a surplus of paint when necessary, and for other uses; **absorbent rags,** or old cloths, clean and white, for drying brushes, etc.

26. Practical Hints on Methods of Work.—A mastery of the brush and of pigments can be acquired only by actual practice. A mere reading of a treatise on water color work will not provide the student with the skilfulness and "knack" required for doing successful water color work. However, there are certain practical suggestions that the student will be glad to receive as to how to overcome or avoid troublesome difficulties. Some of them we will discuss below.

27. Stretching or Mounting Paper.—If water color paper is simply pinned to the board with thumb-tacks the washes of color will cause it to wrinkle to such a degree as to make good work impossible. To prevent this the paper should be stretched or mounted on the drawing board. The process for doing this is as follows:

Obtain some good library paste, small brush, sponge, water, and dry cloth. Be sure that your drawing board is perfectly clean and free from oiliness. Lay the paper "right" side up on the board. (The "right" side of any water-marked paper is that which is toward you when you can read the water-mark in its proper sequence of letters. Turn up an edge about $\frac{3}{8}$ inch or $\frac{1}{2}$ inch wide all around the four sides of the paper, so that the paper resembles a large flat dish or tray with a raised edge. Now reverse the paper so that the "wrong" side will be up, the paper resting with its folded edges (reversed) touching the board. Apply the paste with a brush to this folded edge, so that the paste is on the "wrong" side of the paper, and then go quickly over the paper with the wet sponge, taking care not to touch the paste. Then reverse the paper so that the "right" side will be up, and smooth it from the center toward the edges with the dry cloth, pressing down the pasted edges until they are sufficiently dry to adhere to the board at every point. The surface may now also be moistened with the damp sponge. If the edge of the paper does not adhere tightly at certain places when the paper and paste are still moist, several thumb-tacks should be placed at these points. Lay the board flat and give the paper time to dry by evaporation; do not try to "hurry" it by placing it in the heat, for this will probably cause the paste to crack loose from the drawing board. The paper will at first look wrinkled and spoiled, but will soon dry and be perfectly smooth.

The paper may be removed, after the painting is completed, by running a flat knife blade under the edge and thus "cracking off" the pasted edge; or a knife point may be used to cut the paper free from the board, leaving the pasted edge remaining.

28. Care of Brushes, Pigments, and Color Box. The materials furnished to the student for this work are of the highest quality, but unless he takes care of them properly it will be only a matter of a few days until they are useless. Naturally, the student must be advised on this matter in order to properly care for the tools with which he works.

Brushes.—Every care must be taken to keep the hairs of the brush coming to a point. To this end the brush should never rest on its tip, either in water or out of it, for this destroys the tip, which means the destruction of the brush. The point of the brush should not touch anything except the paint and the paper, and then only when in use. When removing paints from the pans in the color box, the brush should be placed in the middle of the pan and drawn backward—*never* pushed forward—in withdrawing the paint from the pan. The brush should never be kept standing in water, for the hairs will thus be loosened.

After using it, the brush should be thoroughly cleansed with clear water and wiped dry with a cloth, the hairs being brought to a point and allowed to dry that way. When brushes are not in use they should be placed in a jar so that they rest on their handles, and keep in an upright position.

Pigments and Color Box.—The tendency of beginners in water-color work is to neglect to keep their paints and color boxes clean. Water color work to be worth while must give evidences of freshness and purity; any suggestion of muddiness in a study spoils it at once. Such freshness and purity can come only from colors and a color box fresh and pure and clean.

Streaks of different colors all run together into a muddiness that may seem "artistic" to some beginners, but prevents successful painting, must be avoided. The compartments of the color box and all places where color mixing has been done must be washed clean with clear water and a sponge. The various pans of pigments must themselves be cleansed of any foreign pigments that may have become mixed therewith. This should be done regularly after each time the colors are used.

Colors should be moistened by a few drops of water to keep them in good condition; and the color box—when not in use—should be kept tightly closed to keep out dust and dirt.

29. Working by Artificial Light.—Many students, whose daily work occupies all the available daylight hours, are compelled to work by artificial light. It is well known that the tendency of artificial light is to take the yellow out of any color work; therefore, when one paints a composition study by artificial light one unknowingly gets too much yellow in the color scheme, the result being very disappointing when the work is seen the next morning by daylight.

There are various ways to overcome this difficulty, some of which are as follows:

(*a*) If the student has gas light in the house he should procure a Welsbach burner and mantel and simply fit it onto the gas jet. Better still, he could use what is known as an "inverted" gas light, also employing a Welsbach mantel. This light makes a very good white light closely approaching the natural light of day.

(*b*) If he has incandescent electric lights or the ordinary kerosene lamp to work by (both of which give a yellow light) he need simply rig up a little contrivance with bluish or greenish tissue paper, so that the yellow rays from the lamp coming through the bluish or greenish tissue paper give approximately a white-light.

(*c*) Should it not be practical to use either of the above plans, the student will have to find out by experiment what amount of yellow must be kept out of his water color studies when done at night. A study may be made in daylight, and a similar one made by artificial light and the two compared again by daylight. This will reveal the excess amount of yellow.

The above plans should be tried only when it is absolutely impossible for the student to work by daylight. He should, however, endeavor in some way to set aside some daylight time for his water-color work, even if it is only an hour in the early morning.

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FIG. 1

REQUIRED WORK IN THIS SECTION

NOTE.—The student is to prepare and send to the Schools for criticism the following renderings and written work:

(*a*) Color Plate A, Fig. 1, described in Arts. **30** to **32**.
(*b*) Color Plate B, Fig. 2, described in Arts. **33** and **34**.
(*c*) Color Plate C, Fig. 4, described in Arts. **35** to **41**.
(*d*) Written answers to Examination Questions at end of Section.

The colored drawings and sheets of written answers are to be so folded that they can all be mailed FLAT in the large $9\frac{1}{2}'' \times 12\frac{1}{2}''$ envelope provided, and all mailed to the Schools at one time for examination.

COLOR PLATE A

30. On a sheet of stretched drawing paper lay out a diagram in pencil, as shown in Fig. 1. Make the ten squares on the upper part of the sheet 1 inch on each side and the ten rectangles below them, 1 inch wide and 2 inches long. Beginning with the upper left-hand corner, lay on flat washes of color on each square with a No. 6 brush well charged from the color pan. The color should not be a thin wash, as in wash-drawing work, but thick and creamy and as nearly full strength as possible without becoming too bulky to handle. It must be thick enough to give its full strength and value on the white paper and thin enough to wash evenly over the surface. It should be tried on a separate piece of paper before being applied to the diagram. With a brush full of gamboge thus mixed, the square in the upper left-hand corner should be washed in, keeping the edges as true as possible and using the brush on its side so as to make broad marks rather than a series of fine ones. Keep a good pool of color in front of the brush, and work it toward the lower edge by slightly tilting the board. When the square has been washed completely full and the sides and edges trued up nicely, the color should be removed from the brush by drawing it across a piece of blotting paper and the pool in the corner of the square removed by touching it with the partly dried brush.

Each square in the upper part of the plate should be similarly washed in with its successive pigments, care being taken to keep them uniform in wash and positive in color. Do not allow any of one color to remain in the brush when it is recharged with another color; wash the brush thoroughly before each change of color, and use perfectly clean water for the mixing of all of these colors, so that none of them may become contaminated.

31. These colors differ somewhat in their transparency; that is, in their quality of allowing the white paper to show through them. Gamboge is very transparent, flows very easily, and is probably more readily applied than any of the others; if applied too thick it will dry dark and brownish, and should the student find this result after his efforts, it will be well for him to thin his wash somewhat and try again. Orange, however, is a body color, less transparent than gamboge unless used in thin washes, but it is very easily managed and will present no difficulties in this simple problem. Yellow ocher is made of earth and has much more body than either, but is still transparent when applied in light washes. Burnt sienna is one of the most useful colors in the color box; it is transparent and very easily managed, showing no tendency to run in streaks nor settle in small mottled dots. New blue is a bright, transparent color, but not particularly powerful in combination with others. Vandyke brown is the most difficult color to handle, especially when large surfaces must be covered with it, for it does not flow readily and is apt to dry in patches. Hooker's green No. 1 and No. 2 are greens that flow well and are particularly effective in painting verdure and foliage. Crimson is a brilliant red inclining toward violet. Prussian blue is a heavy intense pigment, to be used in small quantities. The other two pigments in the color box, Charcoal gray and Indian red, are for use in another subject and may remain untouched when working on this Section.

32. With this idea of the character of these colors, start the graded washes in the oblong spaces beneath the squares.

Start with the gamboge in the upper row on the left. A wash of pure color, the same as that in the square above, should be painted down about ¾ inch; then the tip of the brush should be dipped into the water and the wash carried ¼ inch farther. This operation should be repeated until within a short distance of the bottom, gradually cleaning the brush of the color and adding water until the brush contains almost clear water, with which the space is finished. All surplus color must be removed from the bottom, or it will settle and make a spot. The purpose of this is to get a clean gradation from a pure color to a very light tint.

This exercise should be practiced with every color several times before it is tried on the sheet. The difficulty most commonly met with results from a too sudden jump from the pure color to a lighter tint. This is especially noticeable in the darker colors—red, blue, and brown. The cause of this is usually the addition of too much water when first beginning to blend the colors, but in general practice if any of the washes are spoiled in this way they may be removed from their rectangles by sponging them immediately with a soft sponge charged with plenty of cold water and afterwards drying it up with a blotter. Another wash may then be laid on the place where the first one was, although it is likely to be somewhat darker than the first one, as a certain amount of color will remain in the paper and contaminate the second wash when it is put on. The effects on this diagram are to be produced by single washes, and should not be attempted by a series of thin washes. Remove sheet from board, trim to size 9 in. × 12 in., write or letter on the back class letters and number and name and address, and lay aside until other color plates are completed.

COLOR PLATE B

33. Now lay out another color diagram, as shown in Fig. 2, where the five strips of color are about 1 inch wide and 10 inches long. Here each color is combined with each of the other nine colors contained in the color box. The blendings are not produced by the addition of water to the color but by flowing the pure wet colors together in the following manner: All of the colors should be moist and ready to work with by previously wetting their surfaces and stirring slightly with the point of the brush. A glass of clean water should be at hand for rinsing the brush, and when drawing one of the columns of color the student must work from top to bottom continuously, without stopping for any purpose whatever.

Divide each column into about nineteen spaces, each of which will be a little over half an inch. Do *not* measure these spaces with a scale and draw lines; simply judge them by eye measurement. With the board slightly tilted and with a full brush of gamboge the student should lay on a wash of color covering the first space. While the pool of color remaining at the bottom of the first space is still wet, the brush should be rinsed quickly in clear water and the next lot of pure color, orange, should be taken onto the brush and applied to the lower edge of the pool of gamboge left standing at the bottom of the first space. The orange will blend softly in the second space with the pure gamboge and will leave a pool of mixed color at the bottom of the second space.

The addition of the second color will of course swell the pool to some extent so that some of it will have to be removed; otherwise, the mixed color will flow down too much and overwhelm the pure color below. A sufficient amount must be left, however, to make a soft blending. After the mixture has been made, the brush should be quickly rinsed and filled with pure orange and continued down two spaces more. After again rinsing the brush, the mixing operation should be proceeded with in the next space below, adding yellow ocher. This pure yellow ocher is to be afterwards blended into burnt sienna, and so on.

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Fig. 2

34. The following is the order in which the colors are applied in each of the columns:

Column 1	Column 2	Column 3	Column 4	Column 5
Gamboge	Orange	Yellow ocher	Burnt sienna	New blue
Orange	Burnt sienna	Hooker's green No. 1	Prussian blue	Vandyke brown
Yellow ocher	Hooker's green No. 1	Orange	Gamboge	Burnt sienna
Burnt sienna	Prussian blue	Gamboge	New blue	Orange
New blue	Vandyke brown	Burnt sienna	Crimson	Yellow ocher
Hooker's green No. 1	Gamboge	Crimson	Orange	Prussian blue
Crimson	Yellow ocher	Vandyke brown	Hooker's green No. 1	Orange
Prussian blue	New blue	Orange	Vandyke brown	Crimson
Orange	Crimson	New blue	Yellow ocher	Gamboge
Vandyke brown	Orange	Prussian blue	Crimson	Hooker's green No. 1

The errors usually made in this work are: first, the tendency to use too weak color, and second, the tendency to use too little color; thus, a hard, dry, patchy effect is the result. In blending a dark color into a light one, the student is likely to allow too much of the dark color to run down, thus covering the light color and entirely annihilating it. In practicing this work endeavor to avoid any appearance of a horizontal line where the colors seem to blend. The addition of a little more of the pure color and tilting the board so as to allow it to flow downward will obviate this difficulty.

Practice this exercise several times before attempting to send in a final sheet for criticism, and to try to observe the differences in successful handling, where a light color is blended into a dark color and where a dark one is blended into a light one; also, where two colors of the same tone are blended together.

One of the greatest advantages of practice in this work is the training that it gives in the mixing of colors on the paper instead of on the palette or the tray. A freshness and brilliancy of color is thus obtained that cannot be acquired in any other way.

These blendings of Color Plate B should represent the student's very best efforts, after having done a great deal of preliminary practice work.

Remove sheet from board and place data on back as for Color Plate A. Then trim to size 9 in. $\times$ 12 in., and lay aside until another color plate is finished.

COLOR PLATE C

35. Lay out on a stretched sheet, 15 in. × 20 in., the dimensions given in Fig. 3. This plate will be rendered as in Fig. 4, and shows: first, in the circular figure, the composition and relation of the primary, secondary, and tertiary colors; second, in the four squares at the top, a demonstration of simultaneous contrast; third, in the nine rectangular spaces, mixtures of colors forming grays; fourth, in the three squares at the bottom, a demonstration of three kinds of contrast—tone, hue, and tone and hue combined; fifth, in the long rectangle on the left a graded wash, beginning with new blue and ending with burnt sienna; sixth, in the rectangle on the right, a scale of yellow showing the normal color, two tints and two shades.

36. Begin with the circular form, Fig. 4 (*a*), and lay washes of pure crimson, new blue, and gamboge in the central sections to represent the primaries. Use a small brush and keep the edges of the washes sharp and clean. A perfectly flat wash is required, and the color must be fresh and brilliant. With the red and yellow mix orange, adjusting the proportions so that neither the red nor the yellow noticeably predominates in the hue, and lay this color in its proper space. Proceed in the same manner to mix the green and the violet from their respective elements.

The idea is not to match the colors on the plate exactly, but to make a representative mixture of the colors at hand. They are likely to be slightly different from the plate owing to the difference in reproduction, but this is not important as these exercises are designed to fix in the mind certain facts about color.

With the orange and green now mix the tertiary citrine, which should be yellowish in hue owing to the predominance of yellow over the red and blue—yellow being the element common to both green and orange. Next, make russet from violet and orange; this color will be reddish in hue. Lastly, from green and violet make olive; this will have a predomi-

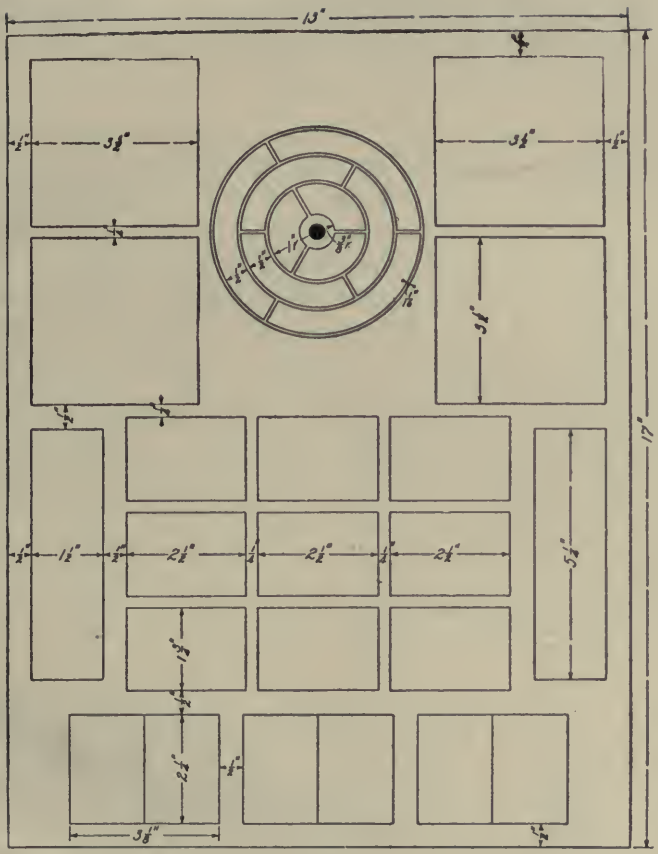

FIG. 3

nance of blue. Paint the small circular space in the center with black ink or any black pigment, leaving the circle of white around it. This, with the black enclosing line described with the compass, completes the figure.

It will pay to study well these primaries, secondaries, and tertiaries, so that they may be readily recognized whenever seen, either alone or in combination.

37. Lay flat washes of red, violet, green, and yellow, respectively, over the four squares, Fig. 4 (*b*), (*c*), (*d*), and (*e*). Make the gray circles on a separate piece of paper 6 inches square, pin it to the drawing board, and apply a perfectly flat wash of neutral gray made from a thoroughly stirred mixture of the three primaries or with diluted drawing ink. When dry, with a compass mark out two concentric circles whose radii are $1\frac{1}{4}$ inches and $\frac{5}{8}$ inch, respectively. Cut these out and paste them in the squares of color. The contrast may not appear strikingly evident at first, but if one looks at the colors in a rather subdued light or through white tissue paper, the contrast will at once become evident. The circle on the red square will appear greenish, the complementary color of red; the circle on the purple square will appear yellowish, the complementary color of purple; the circle on the green square will appear reddish, and the circle on the yellow will appear of a purple tinge.

38. The exercise in the making of grays, Fig. 4 (*f* to *n*), is designed to help in matching colors quickly and in applying mixed color in a proper manner. It is not difficult to paint and keep washes transparent with pure single colors, but no sooner do we begin to handle mixtures of two or more colors than there is a tendency toward lifeless color and muddiness—qualities exceedingly undesirable in painting. The tints should be clear and luminous, even when bright colors are not employed.

Ruskin says, in his Elements of Drawing, "Give me some mud off a city crossing, some ocher out of a gravel pit, a little whitening, and some coal dust, and I will paint you a luminous picture, if you give me time to gradate my mud

(b)

(a)

(d)

(c)

(e)

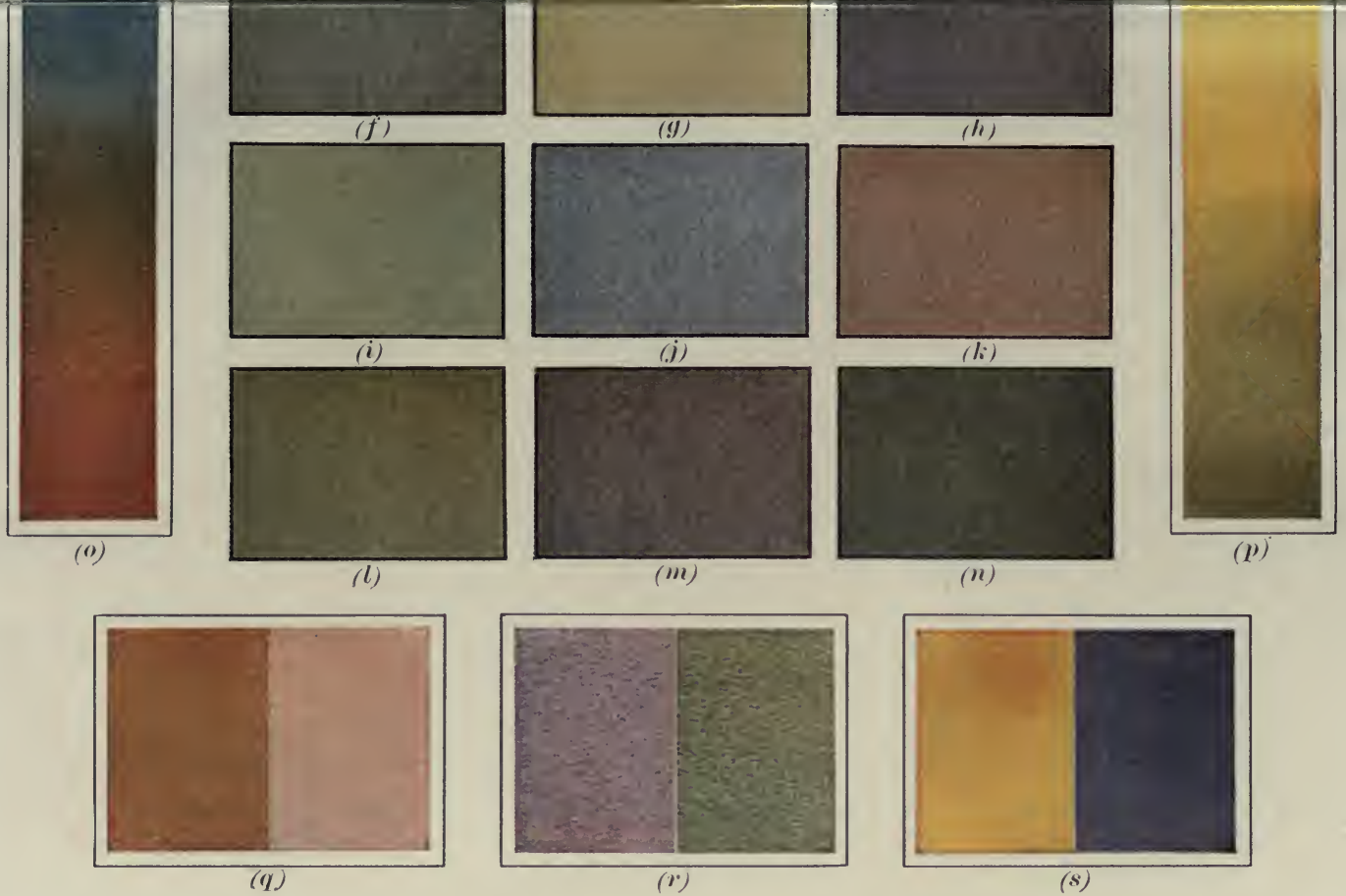

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FIG. 4

and subdue my dust. But, though you have red of the ruby, the blue of the gentian, snow for the light, and amber for the gold, you cannot paint a luminous picture, if you keep the masses of those colors unbroken in purity and unvarying in depth." In other words, the mixing and laying on of the color—that is, the handling—has more to do with the beauty of the result than has the nature or quality of the colors used.

In these grays, then, it is desirable that the colors should be so combined and applied as not to produce flat, uninteresting neutrality, but rather a wash of luminous, iridescent quality, which on close inspection shows slight gradations of tone and color, while at a little distance it appears to be one tone and one hue. To do this, it is necessary that the colors be only partly mixed or stirred together.

The best results are obtained by mixing the color more or less on the paper. Take the first example—gray made by a mixture of crimson, new blue, and gamboge. Make a strong wash of each in separate compartments of the color saucer, fill the brush by dipping it successively into the three colors without any stirring, and apply boldly to the paper with a stroke sufficiently wide to show the hue. You will see instantly if the color is of the desired depth or if too much of any one color is evident, and to counteract this, dip into one or another of the colors, as the case may require, and at once modify the color already applied. And so, renewing the colors frequently and taking care not to allow the colors to become too neutral by brushing, proceed until the desired area is covered. After gaining more confidence through experience, the student can work more directly from the pans of color.

39. Each one of these grays is capable of many variations of tone and hue. A light tone is more easily handled than a dark one, and a very dark tone made with one wash is not practicable. The ones shown in the chart are about as deep as they can be made in single washes, without producing a muddy effect.

The combinations of colors used in the grays of Fig. 4 are as follows: (*f*) gamboge, new blue, and crimson; (*g*) gamboge, Prussian blue, and crimson; (*h*) yellow ocher, new blue, and crimson; (*i*) crimson and Hooker's green No. 1; (*j*) new blue and orange; (*k*) orange and Hooker's green No. 1; (*l*) Vandyke brown and Hooker's green No. 1; (*m*) burnt sienna and new blue; (*n*) burnt sienna and Prussian blue.

Make the first one at the upper left-hand corner slightly reddish in hue, the next slightly yellowish, and the next bluish or purplish. These are made by mixtures of three colors. In general practice, never use more than three colors to match any hue, and if possible do it with two colors. The remaining six washes are combinations of two colors, and all will be found useful in the rendering of the different subjects to follow. These will be found easier to manage than the three-color grays.

Any two opposite, or approximately opposite, pigments will combine to form a gray. Hooker's green No. 1 and crimson make a pretty, transparent gray, which always has an iridescent quality on account of the separation of the pigments, due to their chemical composition. Hooker's green and orange do not combine thoroughly, even when stirred, but make a useful gray, though it is apt to be somewhat opaque. New blue and orange combine very easily, and readily neutralize each other. Vandyke brown and Hooker's green readily combine and make a very pleasing green gray. Burnt sienna with new blue and with Prussian blue forms beautiful and useful grays.

The blended stripe (*o*) shows new blue graded into burnt sienna. Start with the blue at the top, carry the pure color down about 1 inch, then gradually add the other color, first allowing the blue to predominate, and then the sienna, until finally the pure sienna is used.

40. Fig. 4 (*q*, *r* and *s*) illustrates three kinds of contrast. Contrast of tone, as at (*q*), Fig. 4, is made by carrying a light wash of color over the whole square, then covering the left half of the space with a deeper tone of the same color.

Any color may be used for this, provided there is enough contrast. Burnt sienna is chosen in this case for the sake of harmony with other colors on the plate. Contrast of hue, shown at (*r*), is made by placing a wash of reddish gray, made of crimson and Hooker's green, in juxtaposition with a greenish-gray wash of equal value made with Hooker's green and burnt sienna. There should be no contrast but that of color in this one. Contrast of hue and tone, which is illustrated at (*s*), is made by placing a wash of gamboge in juxtaposition with one of bluish violet made with crimson and new blue.

41. To make the scale, shown at (*p*), of yellow, start at the top with a thin wash of gamboge and carry it down 1 inch, then increase the strength to match the second tint, and continue 1 inch more. For the next tone, the full strength of the gamboge is used. To continue with the two shades, add to the yellow enough violet, previously prepared from new blue and crimson, to make the desired depth, and continue 1 inch more; then add more violet for the last and deepest tone. This ought to be done rapidly enough and with sufficient color to make it blend nicely.

When this Color Plate C is completed, remove it from the drawing board, place customary data on the back, and trim the sheet to 14 in. $\times$ 18 in. Then fold it once horizontally, right under Figs. (*c*) and (*e*). Fold it again, vertically down the center, which will make it about 7 in. $\times 9\frac{5}{8}$ in. Then place it, along with Color Charts A and B and the written answers to the Examination Questions, in the large $9\frac{1}{2}$ in. $\times 12\frac{1}{2}$ in. envelope stiffened by the corrugated cardboard and send all the material, FLAT, and *at one time*, to the Schools for examination.

RENDERING IN WATER COLOR

INTRODUCTION

1. Textures.—Before beginning the rendering of an object in color, the student should examine it carefully with his eyes open to color impressions and his mind as free as possible from any preconceived notions as to what he is going to see. Fig. 1 shows a glazed vase, the local color of which is a deep red. It is placed in a strong light. After determining the form and local color, the light, shade, and cast shadow common to all opaque bodies, the student will note a shiny high light, or reflection of the window, that appears on the light side variously distorted, at every sharp turn of the surface. This is at once a key to the **texture** of the object—it is hard and shiny, in fact, it is a red mirror reflecting more or less perfectly every object, every surface around it, and not only the form but also the color of such objects and surfaces. Examine this high light closely and you will find in it a faithful reproduction in color of whatever of the landscape is visible through the window. What has become of the local color red at this point? It is absolutely overcome by this reflection of strong light and does not reach or affect the eye. There, then, is at least one spot on this red vase that cannot be represented by red pigment. But this is only the extreme case, for every inch of this reflecting surface is similarly affected, the degree varying according to the luminosity of the surface reflected. For instance, the light gray surface, upon which the vase rests, is reflected part way up from the base, and though affecting the red decidedly by making it lighter and grayer, it does

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not entirely overcome it, as does the brilliant light from the window. Observe the effect of the light and shade aside from the reflections. The red on the side nearest the window is decidedly lighter than that on the side turned away from the light; at some point part way between these two extremes, we will find the purest red, thus reaching the conclusion that the strong light has a tendency to weaken the color as well as to make it lighter, and that the shade both dulls the color and makes it darker.

This is a very good example of how the local color of an object may almost completely give way to other colors than its own. The apparent color, then, is not simply red, but red with some decided variations, and it is with this apparent color that painters have to deal. It is a well-known fact that a trained perception is necessary for the instant observation of this apparent color, for the eye of the beginner often refuses to see it until it has been pointed out repeatedly. Remember that every object which we shall ever have to paint is affected in its color somewhat like this red vase, which was chosen as an extreme type on account of its strong local color and its reflecting quality.

2. The color of an unpolished and unglazed object, such as Fig. 2, is very much less affected by the color of the light or of the surroundings. It is not so much a mirror as the other, as it has a different texture—there is no shiny high light here. There is, however, a much more decided light-and-dark division than in the shiny object, the light and shade being undisturbed by any sharp reflections of other objects. Besides, the shadow side of the object is duller and cooler than the side in light, the purest color being in the half light between them. The shadow, then, cannot be correctly produced by a stronger tone of the same color as the part in light. This the beginner almost invariably tries to do, and as a consequence his work looks tame and dull in comparison to the work of the artist, who recognizes that the diminishing of the light and the law of contrast necessarily produce a change in the color. By the law

of contrast, we know that this yellowish-gray color in the light must call to our vision a hint of its opposite—purplish gray. We, therefore, learn to modify the shadow color by the addition of the color that is approximately complementary to the local color of the object; if the local color is cool look for a warm shadow, and vice versa.

Observe a dull and comparatively colorless object—the rusty iron lock, Fig. 3. To the untrained eye it presents no local color, and the novice would probably render it without color except in the rusty spots, which appear a reddish brown, black serving his purpose for everything else. But this rendering would not satisfy the eye trained to see color, for the charm that comes from the slightly varying hues of the delicate grays will be entirely lost. One may always depend on this fact: that everything in nature is colored except absolute darkness; there can be no absolute black without entire absence of lignt. Examine a piece of dull, black cloth hung in folds in a good light. Is it black all over? Decidedly not. The light parts are a bluish gray and cannot be correctly rendered without using color. Even the darker parts at a little distance are not absolutely black; they could be rendered correctly without using a particle of black pigment. The sooner we accept this fact that everything in nature is colored, and begin to look for and analyze these various subtle hues in the comparatively colorless objects, the sooner our eyes become sensitive to color and we are able more quickly to match and record the colors that we see. So in this old iron latch let us look for a variety of hues of gray. There are, perhaps, not 2 square inches of the surface exactly alike in hue or tone, and it is in just this gradation of color and tone that most of the charm lies.

The law of simultaneous contrast is of great assistance to us here. Having seen how readily the neutral colors are changed by varying the stronger colors surrounding them, we may know when seeking to determine a neutral color in nature what hue to expect by noting the surrounding color and thinking of its opposite. No matter what we paint we will be,

as has been said before, chiefly concerned with these modified hues, so let us observe them in everything about us, analyzing and matching them mentally and especially noting the difference in hue between the light and the dark sides of objects. When confronted with a new subject the student should ask himself: (1) What is its general hue? (2) What color ought I expect to find associated with that hue? (3) What is the character of the surface—what is its texture—polished, smooth, and dull, or broken and rough? (4) How does this particular quality of the surface affect the color? (5) Are the immediate surroundings of the object forceful enough in color to noticeably affect it by simultaneous contrast, or vice versa? For instance, if the object is a neutral gray placed against a bright-green ground, is there not a tinge of the opposite color, red, distinctly visible in the gray, or vice versa? A white cardboard partially turned away from the light makes a beautiful transparent gray, against which experiments in noting these subtle contrasts may be performed for the education of the eye. Place variously colored objects against it one at a time, and look at them steadily until the eye grasps the relation of the two. The change will be most noticeable when an object of one color is quickly replaced by one of an opposite color.

3. A most interesting problem, and one that often proves exceedingly puzzling to a beginner, is the object that is colorless and transparent, such as a clear glass bottle or tumbler, or one partially filled with water or a colored fluid, as shown in Fig. 4 (*b*) and (*c*). In the case of the clear glass, the color is entirely dependent on the surroundings. A very important point, in this case, is the lack of any distinct divisions of light from shade, the light penetrating the transparent material and illuminating what ought to be the shadow side, so that very often the portion of the object immediately surrounding the high light is darker than the side opposite the light. When colored fluid is added, as at (*c*), or when the glass has a color of its own, as at (*a*), the problem is changed. If the fluid is opaque, the subject is

similar to that of the opaque glazed object; if transparent, it is the same as the colored glass.

The old rusty lantern, Fig. 4 (*d*), is of a very different color from what it apparently would be if the background and surroundings were of a different color. The local color does not become entirely lost in the deep shadow, but tends strongly to purple where it contrasts with the greenish background.

Much more benefit will be derived from making studies from similar objects to the ones mentioned than from copying these illustrations. We would recommend that a similar subject be procured and placed in as nearly as possible the same conditions as the one described, in order to more intelligently follow the description. One will gain, in this way, very much more than by mere copying, in which the effect may be readily produced by matching color for color and tone for tone, as they are found, without thinking at all of the construction of the original, or of why this color is here and that there, why this light is opposed to that dark, etc., all of which has been carefully observed and considered by the person that painted the original. Copying from the flat, while it helps considerably in the way of handling, does not materially aid the perception, and for that reason the student is urged to search carefully for these things in nature and learn for himself.

DRAWING PLATES

DRAWING PLATE, TITLE: SURFACE TEXTURE

4. This plate will contain drawings of four single objects to be rendered according to the following directions: The painting may be done on separate pieces of paper if the student prefers, in which case each piece should be 8 inches by 10 inches. First, draw the form of the red vase, Fig. 1, using a soft pencil—about BB; draw it about 6 inches high, marking out all the forms of the reflections. Make an outline map, as it were, of all the different regions of color that can be seen, as shown in Fig. 5, including the form of the cast shadow. In rendering in black and white, the dark pencil or crayon lines can be easily worked into the shading, but in the color work they must not be visible in the finished drawing; neither must the paper be injured by excessive erasure of lines. Therefore, the lines must be light and soft—made with little pressure on the paper so that they can be readily removed if necessary with a soft rubber. Do not depend on removing heavy lines after the color has been applied, for the wash acts as a fixative. A good way is to make a pencil drawing on a piece of thin paper, and then transfer it to the stretched water-color paper. A direct transfer can be made by blackening the back of the thin paper with a soft lead pencil, pinning it over the stretched paper, and tracing over the lines with just enough pressure to leave a light impression. The spirit and character of a drawing is always impaired in a tracing; therefore, the drawing should be carefully touched up, with a very sharp BB pencil, before coloring.

Having completed the drawing make a fairly strong wash of bluish green, and, beginning at the top, carry it down the shadow side covering the region of shade, as shown in Fig. 6 (*a*). This must be done quickly so as to allow of

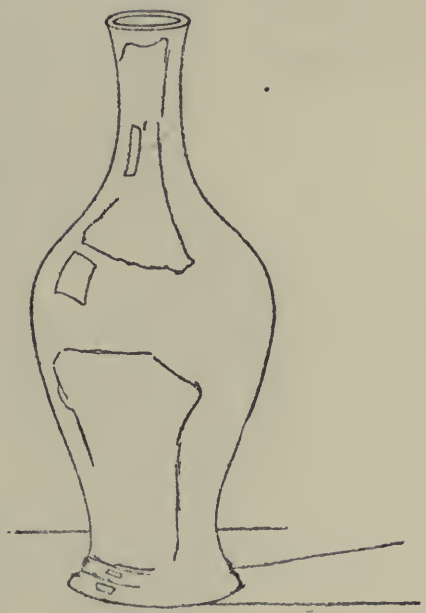

FIG. 5

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FIG. 1

I L T 153 § 4 Fig. 2

I L T 153 § 4

FIG. 3

(a)

(b)

(c)

(d)

I L T 153 § 4

FIG. 4

(b)

(a)

I L T 153 § 4 (*c*)

(*d*)

FIG. 6

I L T 153 § 4

FIG. 7

blending the inner edge with a wet brush. Practice this several times on a separate piece of paper if not successful at first. A somewhat lighter wash of the same color may then be carried down the light side and its inner edge blended in the same way. This first wash fixes the division of light from dark, suggests the rounding of the surface, and serves to modify the red that will be washed on later. Although this wash may be entirely covered by the red, it modifies the red and all subsequent washes.

When the green wash has dried, mix the color of the lightest tone of the red and wash over the whole surface except the shiny high lights, which must be left white and sharply defined to the last, as at (*b*). Where the table is reflected this color should be modified by the addition of yellow. These two washes have fixed the form of the object and are a foundation on which to work. Next, the general tone of the background must be matched and the color washed on freely, changing it slightly in hue during the process so as to avoid monotony. Bring the background color carefully up to the edge of the vase without overlapping. Where the background meets the horizontal surface, do not stop, but lighten or darken the wash as the case may require and go right on, allowing the two tones to blend, as shown in (*c*).

5. The painting of background will present some difficulties. It will be difficult at first to handle a background of any considerable depth of tone. If the first ground is too light, allow it to dry and carry another wash boldly over it, with as little brushing as possible, so as not to disturb the under color. If the washes overlap where they join, the result is a little hard line of darker tone that is sometimes displeasing; but this is often unavoidable and one must make the best of it, softening it with a wet brush after the wash is dry. Greater skill in the handling of the brush makes it possible to join the washes with scarcely any overlapping; indeed, it is often advisable to leave a slight edge of white between the washes, especially in the places where the hard line of dark would be very objectionable. Under

fortunate conditions, two adjacent washes may be dragged together while both are wet. Very often a light background may be carried over the space to be occupied by the object, leaving out only the light parts. Always start with the wash that will give the most effect in one painting. If it is a dark object placed against a light ground, start the object first, and vice versa. In many cases it is possible to start with the background and carry it over the shadow side of the object, blending the edge toward the light. Whenever possible, this should be done when the background and the object contrast in color as well as in tone. If the ground is not a very dark one, try to strike the proper tone in one painting, as this maintains freshness of color.

The white paper is now all covered except at the high lights. These are not to be touched till everything else is done. The drawing at this stage looks rather flat and weak, a mere ghost of a vase, and requires the addition of the darker accents to give it substance, as shown at (*d*). Observe that the deepest and purest red is not in the shade but on the light side of the vase in the deeper reflections. The shade may now be strengthened by another wash of modified red; this time carry the wash over the cast shadow, adding more green to that part so that the result may be a greenish, instead of a reddish gray. The shadow grades in tone and becomes lighter as it recedes from the object. The edge of the table shows distinctly reflected a short distance below the largest high light; above this edge a deeper and purer wash of red may be laid on. It will surround the high light and blend softly into the lighter tint above, and also into the shadow side. It is only where it encounters the reflection of another surface that the edge will be sharply defined, as it is at the bottom. Next, put in the accents around the high lights on the neck and at the base, deepen the tone of the background, if necessary, and add the light tints of color in the reflections of the windows, as shown in Fig. 1.

This method of beginning with the complementary color is serviceable in rendering objects of a positive color, and is given first on account of the quick results obtained. As the

student attains greater freedom through study and practice, he will discover many things for himself, and his work will gain individuality as he progresses. The matching of each color must be done by the eye, aided by the knowledge gained in the experiments with the color charts. The colors used in this rendering are crimson for the red, Prussian blue and gamboge for the green, and the three combined for the more neutral parts—the background and foreground.

6. Next, draw the stone mug, Fig. 2, making it about 6 inches high. This object rests on a sheet of white paper, and is placed against a background of the same material, slightly turned from the light. It forms a study of comparatively neutral colors, and can be painted with several of the grays that were made on the color chart; there is not a spot of pure color on it. The background is so light that we will not consider it at first, but will begin by painting a wash of yellow gray, made with gamboge, Prussian blue, and crimson, over all the surface except the top and the light edge of the handle. With a wet brush, wipe off a little of this color where the soft high light occurs, taking note that the edges of this light are not sharply defined, as in the red vase; this denotes a surface only slightly shiny. When the first wash is dry, carry another of decidedly purplish gray over the shadow side and blend it gradually toward the high light; this will round the surface somewhat and separate the light from the dark side. Do this also on the handle, grading the wash to yellow gray at the lower end. Next, paint the portion of the interior surface showing at the top; begin at the left side of the ellipse with a wash of new blue, slightly modified with burnt sienna, carry it one-third of the way across, and then use almost pure burnt sienna, making it slightly lighter in tone as it approaches the other side. Wipe out the little spot of high light with a clean brush after the wash has become slightly set. This region is the darkest part of the drawing. It should be finished, if possible, in this one graded wash, which, if well done, makes a pleasing contrast with the lighter

outside surface and expresses the hollowness of the cylinder. The rim may be washed in immediately while this wash is wet; at the ends, where contrast of tone is desired, the washes are separated by a fine line of white, but in the center, where the tones are about equal, they may be allowed to run together; the front edge is left entirely white. Paint the cast shadow with a wash of new blue modified by a little crimson and gamboge, which should be strong enough to about equal the tone of the shadow side of the mug and handle. Soften the edges with a wet brush where they appear blended. Put in the background with a thin wash of new blue slightly modified with crimson and yellow ocher. When the horizontal surface (foreground) is reached, gradually add more yellow, making a graded wash from cool to warm color, which causes this surface to apparently recede. When this is dry, separate the two planes by another wash, which need not be carried all the way to the top. The darker accents of purplish gray must now be put on the curve of the handle and on the surface of the cylinder midway between the high light and the right-hand edge; these washes must be blended toward the high light on one side and toward the reflected light on the other. The bands may be made with new blue and a little crimson, which must be considerably grayed on the shadow side. The high light on the handle may be softened by a touch of light yellowish gray. In all of these exercises, be as free as possible, using your knowledge of the handling of wash to bring out the best qualities of the medium. Remember that water color is only colored wash drawing and that the handling is almost identical. The charm often depends quite as much on the little eccentricities of the wash itself as on the evidences of masterly control. Freedom and the ability to appreciate the qualities of the medium that make it distinct from all others can only be attained by practice. Cultivate boldness and learn to take advantage of accidents of color rather than be discouraged by them. One always has recourse to the sponge when the work is hopeless, and a drawing partly sponged out often makes a very suggestive ground on which to work.

7. The next subject is an old rusted door latch, Fig. 3, very simple in form and easy to draw, though the coloring is rather subtle. As a whole it is a purplish-gray object against a yellowish-gray ground, but both the latch and the old board against which it is seen are so full of delicate gradations of color that there are hardly 2 square inches exactly alike in hue. Before painting this, try to find a similar subject, such as an old horseshoe hung on a rough, unpainted board, and try to see for yourself this charm of color. You will probably say that this color is exaggerated. Place the drawing plate and the subject side by side and look at them from a distance; then paint the subject with the flat grays that are apparent, and compare the two.

After drawing the lock about $2\frac{1}{2}$ inches high all of the iron and the cast shadows can be painted in with burnt sienna and new blue, the proportions varying slightly as the gray becomes warmer or cooler. Lay in the flat planes with one wash each, if possible. It will not be possible to make the colors vary in exactly the same places and forms as in the original; this is not important, but get the right tone and the general color effect. For the background use gamboge, new blue, and crimson; keep the colors in separate compartments of the color box, use a large brush, and dip into them successively, flooding the color on generously with the board held rather flat. This is an excellent exercise in putting on a large wash of broken color. Leave the space for the crack in the door and put in the dark afterwards with new blue and burnt sienna, leaving the little edge of light on the right-hand side. Make the dark shadows and accents slightly greenish; try to make one wash do for each and make them rather deeper than those on the plate. All work should be brighter and more snappy in contrast than the reproduction copied; the edges of washes should be more evident also, and the handling more vigorous, for these reproductions are apt to be softer than the original work.

8. The fourth figure of this drawing plate is a copper tankard, Fig. 7, that we may consider a type of shiny-metal

objects. In texture, it somewhat resembles the red vase, but the surface has not so high a polish, and, therefore, does not reflect light or color to an equal extent. It is placed in a strong light against a light gray ground. Draw the tankard about 6 inches high and locate all the details, as with the vase, Fig. 5. The high lights are quite evident, and are of the first importance, for the first wash must allow for them.

Begin either with this color or leave a space of light to be colored after the stronger washes have been applied. If the object is very shiny the latter method will be safer, as it is easy to misjudge the amount of light or color and make the first wash too dull or too dark, thus losing the brightness of the metal. Only three colors—orange, new blue, and crimson—are used to render the copper. The body of the tankard is painted first in the following manner: A wash of the color for the high light is carried boldly and quickly down the surface, covering a space rather wider than that to be occupied by the light; the color is then quickly modified by dipping into the blue and crimson, and this is carried as boldly down each side of the first stroke before the latter has had time to dry, and afterwards is continued out to either edge, including the spout. (The wash can be stopped at the base, where the high light breaks, and the base painted separately.) The modeling and the shininess are suggested in this first wash, though it is not final except in the light, but must be strengthened by other washes. Before doing anything more to this, however, the first washes should be applied to the lid, the handle, and the portion of the interior surface showing at the top; this latter can be finished in one wash, as in the stone mug, the dark side being started with strong color and gradually blended into the reddish orange of the light side, again becoming slightly darker and bluer as it is carried into the spout. The practice of blending from one color to another in one wash is very useful in cases of this kind. A wash of greenish gray, made by combining emerald green and crimson, should be applied to the background and foreground, and a stronger wash with new blue added can be used for the cast shadow.

The white paper being covered, a stronger wash of the three colors with more red and blue than orange is applied to the body of the tankard; begin next to the high light and carry it to the edges; then soften into the light where a sharp edge is not desired. The irregularity of the edge of the light near the bottom is due to a slightly dented surface.

Little need be said in regard to the small details of accent, except that they should be faithfully studied and carefully placed; the beginner, as a rule, takes good care that these parts of his drawing, at least, are not slighted, and is apt in his solicitude to give them undue prominence. Try to analyze each touch and decide before applying it, why it is there and what is its relative importance to the drawing as a whole. Note that the accenting darks are not alike in tone or color, but that each touch varies slightly in itself, either being lightened by the addition of water or modified by another color. The lights as well as the darks have their gradations and should be carefully noted. The light is more brilliant in the forward parts than farther back.

DRAWING PLATE, TITLE: BRUSH WORK AND FLOWERS

9. Flowers and plant forms make excellent subjects for study in water colors. One of the best means of training the hand and the eye is in **brush drawing**—that is, in the painting of forms in color with no previous pencil drawing, or with only the general directions of the lines lightly indicated. The point of the brush is not first carried around the outline, but the whole form is broadly washed in with the flat of the brush. Flowers and other plant forms lend themselves very readily to this kind of study, as any slight variation of form due to awkwardness in the handling of the brush does not necessarily destroy the character. With a little practice one soon learns how much more freedom the brush allows and how much more rapidly a result may be obtained. A single touch of the brush will often suffice to indicate a petal, while a bold stroke will represent a stem or a leaf; besides, the

freehand brush stroke is much more expressive than the pencil outline carefully filled in with a flat wash; the latter lacks that little charm which comes from the color's doing the unexpected. Water color is not inclined to run perfectly flat—it is against its nature; the fact that every touch grades in itself by settling to one side is a suggestion to the student to recognize and profit by this characteristic of the medium. In no other practice does one learn so quickly to turn to account this quality. Nature's forms are full of exquisitely delicate modulations of tone and color, and these are undoubtedly rendered with more spontaneity by graded color washes freely applied in this way than by any other means at our command. In Fig. 8 are shown brush drawings of a number of simple sprays of different flowers and other natural forms executed by students; such forms as these should be chosen for first study rather than complex subjects.

The Japanese are our teachers in this style of brush work. As a race they seem instinctively to love flowers and all natural forms; and when one considers that they are taught from their youth to use the brush to write with, there is little wonder that their artists have taught the world how to appreciate these forms and how to interpret and apply them in a decorative way. In recent years Japanese art has had a tremendous decorative influence on that of the Western world. Western artists have suddenly awakened to the fact that these people have the most refined sense of fitness, and that as a nation they are probably the most artistic in the world. The following incident illustrates the general art impulse in Japan: A company of men were walking along a road when a great hawk alighted in a near-by tree. Instead of drawing guns to shoot the bird or frightening it away with stones, they immediately drew out their brushes and paper and proceeded to sketch him as he sat pluming himself.

It is not necessary that one should work exactly like the Japanese in order to paint flowers well, though he will be greatly benefited, and his work will profit by the addition of a little of their spirit. If one would paint flowers well he

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Fig. 8

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Fig. 9

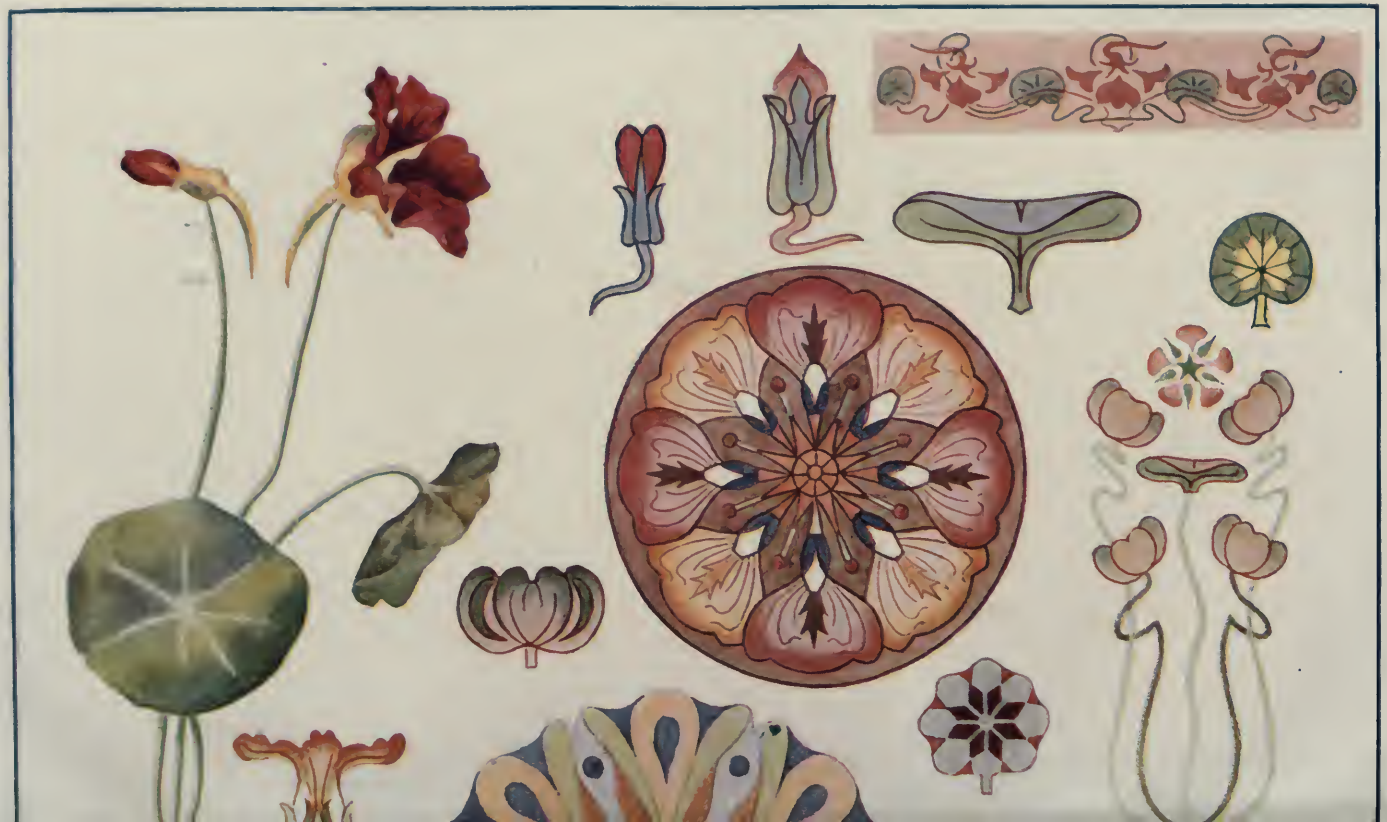

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Fig. 10

I L T 153 § 4 FIG. 11

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Fig. 12

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Fig. 13

must learn to love them, appreciate the graceful lines of their growth, their delicacy of texture, and their charming variety of tone and color. It is safe to say that the majority of people love flowers for their own sakes, so that it requires only a calling of the attention to them as a subject of study to awaken a special interest, which, if the study is carried on, deepens into understanding and appreciation.

This instruction will not deal with the painting of flowers in groups of still life, which treats of the general effect of masses of flowers, but rather with decorative painting, which requires a more intimate knowledge of individual flowers and their manner of growth. The designer, the decorative painter, and the illustrator have constant need of this knowledge, and the study of flowers for the purpose of decorative and conventional treatment forms no small part of their training. The designer draws as much of his inspiration from natural forms as he does from historic ornament; the decorator uses floral forms as much as he does figures and landscapes; and the illustrator uses decorative flowers in posters, ornamental covers and borders, head- and tail-pieces, etc. Practice rendering simple forms, such as shown in Fig. 8. Make them with single strokes of the brush as much as possible and use the colors direct from the box, mixing them as they are applied.

10. Fig. 9 is a reproduction of brush drawings of flowers from nature made by students of applied design. Fig. 10 illustrates how naturalistic studies are translated into decorative and conventional forms.

For first practice it is well to copy good facsimiles of flower painting, not pictures of masses of flowers but decorative sprays in which a few individuals play an important part and a good deal of the character of the flower is shown. Study from life should also be immediately begun. Flowers and other plant forms are almost always at hand, and while all are not equally attractive they make interesting subjects for study; many of the field flowers, grasses, and weeds and their seed vessels make exceedingly interesting subjects and

can be found in almost any locality; house plants can be studied as they grow. Cut flowers change rapidly, but most of them keep long enough to make a sketch. Choose at first simple, single flowers that have color which may be represented on white paper without a background; do not attempt elaborate flowers like the garden rose and the chrysanthemum.

Place a single flower, like the wild rose or cosmos, against a white ground so that the relation of its tones to the white paper may be studied; block in the forms, very lightly, with the pencil, indicating the center of the flower and the radiating lines separating the petals. Let the pencil lines be merely a guide to the proportions and the placing of the parts, and depend on the brush to fill in and correct the form. Paint the center first and then each petal. The first painting should show the saucer shape of the flower. A dark petal may be kept separated from a light one by a tiny line of dry paper. Cast shadows and dark accents may be strengthened afterwards. Fig. 11 shows a cosmos blossom rendered in two stages in the manner above described.

Leaves should be painted before the stems. The beginner is apt to paint the stems first and sometimes gets more than he wants, forgetting that stems are covered in many places by leaves. A single brush stroke often suffices for a simple leaf, or when one side is in light and one in shade, two strokes separated by a thin line of paper; it is sometimes more expedient to carry the lighter color over all, and make the separation with another wash, as in Fig. 8. Only very conspicuous veining should be indicated and then never by means of hard lines; one will observe that in nearly all leaves the veins are made evident by little planes of dark and light coming together; sometimes the dark plane is quite thin but it never forms a wiry line.

Do not draw flowers too small, rather make them larger than life size unless they are very large; very small flowers do not make good subjects for decorative painting. Give stems their proper width, making them neither thick and clumsy nor shriveled; green stems should look sappy—woody

stems are full of character and require close study. Special note should be taken of the manner of branching of stems and the changes of direction that they take at the joints. Although botanical correctness is not essential in flower painting, any knowledge of botany is helpful in that it assists the observation and tends to prevent glaring mistakes in structure. The local color of the blossom may always be carried throughout the stems and the leaves. When painting a red flower, look for red in the whole plant—you will surely find it; this helps to hold the color together and prevents glaring contrast. Beginners paint leaves too green; they fail to note the effect of light and shade on the local color. The lights on shiny leaves are bluish, and sometimes almost white. Light shining through a leaf makes it appear yellowish green. Leaves in half light are a rich green, and in shadow a dull, grayish green. Bright greens and strong contrasts in leaves should be subdued in order that they may not claim attention before the flowers. The management of leaves and stems is usually more difficult than that of flowers, because there are apt to be so many more of them that they require some degree of elimination and arbitrary arrangement. Forms may be kept in the background by reducing their color and contrast of tone; this may be seen in Fig. 12, where the two rear flowers and one of the seed vessels have been given this treatment.

11. Having practiced these simple sprays of flowers repeatedly and thus acquired the ability to render them fairly well, give attention to the pleasing arrangement of floral forms in a given space, simplifying and idealizing the forms themselves. Fig. 12 presents a study of single hollyhocks drawn from life. This is one of the flowers that wilt soon after being cut, so that it must be studied as it grows. The study here given was made out in the sunshine with an old gray fence for the background. The hollyhock is a very decorative plant and, growing so tall and straight, is readily adapted to an upright panel; it has a remarkable variety of forms—buds, flowers, seed

vessels, and leaves—each of which is interesting in itself besides lending to the decorative effect of the whole.

The rendering of this study will be comparatively easy, for the forms are very simple and the light and shade clearly defined. Sketch the outline lightly, making the panel about 17 inches high. First paint the two important flowers in the manner shown in the rendering of the cosmos, but with more contrast, as this flower is deeper in color and in a much stronger light than the cosmos. Begin the wash at the upper edge of the flower and carry it to the edge of the shadow, where it can be left sharply defined. Work around the light forms in the center, but endeavor to paint some of their color before the first wash is quite dry. Leave white paper for the ends of the stamens and pistil and the highest light on the petals immediately below the dark center. The texture of these petals is somewhat similar to very delicate silk, which accounts for the shiny high light and the number of small, sharp planes.

As in the other studies, paint each form in its first stage; go back to the most important one and finish that, then the next in importance, and so on. Before painting the leaves, note carefully their tones in relation to the background and to one another, also their diversity of color, the difference in the color of the upper and under surfaces, etc. When the entire spray has been painted, lay the drawing nearly flat and wash on the light gray of the background with a large brush; it should be carried carefully around the forms with the exception of the two rear flowers and the seed vessel that is in shade. Crimson and new blue may be used in the flowers with some Vandyke brown in the deeper touches; gamboge, with emerald green for the lighter greens and with Prussian blue and some crimson for the darks; and the same in light washes for the reddish gray on the leaves. The background may be made with a thin wash of emerald green and crimson.

Sketch Fig. 13 about 10 inches high. After careful study of the color combinations, endeavor to reproduce the *effect* of the flowers themselves rather than to copy the original study.

Fig. 14

Fig. 15

DRAWING PLATE, TITLE: DRAPERY

12. The beauty of the folds of drapery and its rich variety of color and texture have made it a favorite study with artists for centuries. It is only necessary to look at the various reproductions of the old masters to see with what loving care they treated the draperies in their pictures, either when used upon figures or as accessories. Those of Gothic and early Renaissance times are especially rich and are often worked out in infinite detail, showing clearly the elaborate patterns. The modern painter is chiefly concerned with the color and texture, and if the goods have a decided pattern it is suggested in a broad way, but is seldom worked out. Drapery plays such an important part in art productions, that the artist must be thoroughly familiar with the appearance and the main points of difference in various fabrics. In rendering drapery, one of the chief considerations is texture. The student has learned that texture is made evident by the manner in which surfaces are affected by the light; a hard, polished surface reflects the light sharply, thereby making decided contrast and clear-cut forms of light and dark, while a rough surface absorbs the light and presents not sharp contrasts but soft gradations from light to dark. In fabrics, silks and stains correspond to the polished surfaces, and cotton and woolen goods of varying degrees of roughness correspond to the unpolished surfaces.

The expression of texture is a part of the drawing and can be accomplished in black and white quite as well as in color, for it depends on the placing of dark and light values. Examine closely the four textures shown in Figs. 14, 15, 16, and 17, which are reproductions from photographs of different fabrics. Fig. 14 is a satin, which approaches nearest to a polished surface in quality; note how sharply it reflects the light and with what definition the various regions of light and dark are marked out. This characteristic makes this texture much less difficult to render than some others, the boldness of its planes being much easier to perceive and to record than the subtle gradations of tone in the cotton

goods. In the silk, Fig. 15, we note somewhat the same qualities as in the satin; it is, however, a softer and more pliable goods and is broken up into smaller planes, which are apt to be angular and sharply defined. Velure, Fig. 16 (also velvet and plush), has a peculiar shininess, which comes not where one would naturally expect to find it—in the direct light—but on the planes that are partly turned away from the light and on the edges of the folds, where the light strikes the sides of the masses of silken threads forming the long pile. The planes turned directly toward the light are apt to be very much darker; the blotchy effect is due to the nap being disturbed in places, the surface being brushed in different directions. The light and dark regions are sharply defined, but the edges are more softly blended than in the silk or satin. Cotton goods, shown in Fig. 17, hang in rather limp folds; the masses are large and simple and the contrast not great. Starched cotton goods exhibit more sharply defined and angular planes.

13. The first drawing on the plate, Fig. 18, represents a piece of old, blue velure, in which the pile has been disturbed by considerable handling. Before copying this figure, secure, if possible, a piece of goods of similar texture (not necessarily of the same color), and drape it on a chair somewhat in the same manner; a small piece will answer even if it is in the form of a garment. The student should do this with all the different textures, and thus observe for himself the points brought out.

To render the velure, first draw the different folds carefully, twice the size of the original, and mark out the important lights and darks with a pencil; then start at the highest part with a wash of Prussian blue, slightly modified with emerald green, and carry it over all the folds, adding a little orange in the parts where that color is evident. When this wash is dry, wipe out the high lights along the edges of the folds, with a wet, bristle brush, being careful to observe the form and the varying intensity of the lights. Use the bristle brush gently, as the color comes off quite readily and care must be

FIG. 16

Fig. 17

taken not to rub up the surface of the paper. The two folds to the extreme right have been purposely left in the condition thus far described. Do not make this first wash absolutely unvarying in either hue or tone; and, on the other hand, do not get a spotted effect by applying the added color too weak or too strong. After wiping out the lights, separate the folds by the darker washes of Prussian blue and crimson, and Prussian blue and orange. Notice how these deep washes vary both in tone and color; every touch must be graded one way or the other in order to get a good effect, so be prepared when you begin to lay on a wash, even over a very small area, to change its hue by touching in another color, or its intensity by adding water. This point cannot be too often repeated, for in its application lies the chief charm and most essential characteristic of water color.

Take each fold separately and put on the deeper tones that break its surface, noting where the edge of this broken wash is sharp and where it has been blended by the touch of a wet brush; the color is the same—Prussian blue with a little crimson or orange. While doing this, do not fail to observe carefully the relation between these dark touches and the still darker ones in the deep folds, also the relation between the various folds themselves; determine which is the lightest, and at which point lies the strongest contrast. When this is done, look over the whole drawing carefully, strengthen the darks, if necessary, and soften any edges that have been left too sharp. If occasionally a tiny speck of white paper has been accidentally left, do not try to remove it; no harm results if it is left unless the spots are too many, or too large, when they will assume the importance of lights. The suggestion of a chair is painted with burnt sienna, Prussian blue, and crimson; the floor and background are made with burnt sienna and Prussian blue. Render the accessories as freely as possible, allowing the interest to center in the drapery.

14. The next subject, Fig. 19, is a piece of delicate pink satin draped in large folds that hang somewhat like a lady's

skirt. It must be carefully drawn about twice this size and all the little wrinkles mapped out, for in their form lies the secret of the texture. The only colors used for the entire drawing are crimson, new blue, and gamboge; it is a combination of delicate hues of gray carefully put together.

A light tint may first be carried over the whole drawing, toning down the white of the paper to the color of the high lights; this, like all other first washes, must not be alike in color all over, but must vary from warm to cool in different parts. In the large fold to the left the red and yellow predominate, while in the center and in the shadows the blue is more evident. Although the general hue of this drapery is pink, it has the iridescent quality of mother of pearl, due largely to its ability to reflect to quite an extent the surrounding color; every change of plane, therefore, calls for a slight change of color. Make the larger divisions, as in the preceding study, by putting in the larger shadows, which in this case are not deep in tone, but are full of a reflected color from a greenish-yellow wall. Pay no attention to the small reflected lights in the shadows—they may be wiped out afterwards; think of the shadowed mass as a unit, concerning yourself with the general tone and hue. Note that the shadows are darker and purplish at the top, but gradually lighten and become greenish as they widen out toward the bottom. Here we have again the gradation on which depends, more than on the color itself, the quality of transparency that is so charming in all painting.

Next study the fold to the left; note the ripple of light and shade-like reflections in moving water. In applying the wash, follow the forms of the dark carefully, leaving sharp edges to be softened afterwards. Observe here, as in the last study, that all edges are not softened, many being clearly defined while others disappear altogether. In this sharp definition of light, we see the resemblance to the polished or glazed surface. The folds lying on the floor, in the horizontal plane, are more generally dark than the upright folds. Indicate this fact by a first general wash over everything but the few high lights. The soft lights may

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Fig. 19

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Fig. 20

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Fig. 21

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Fig. 23

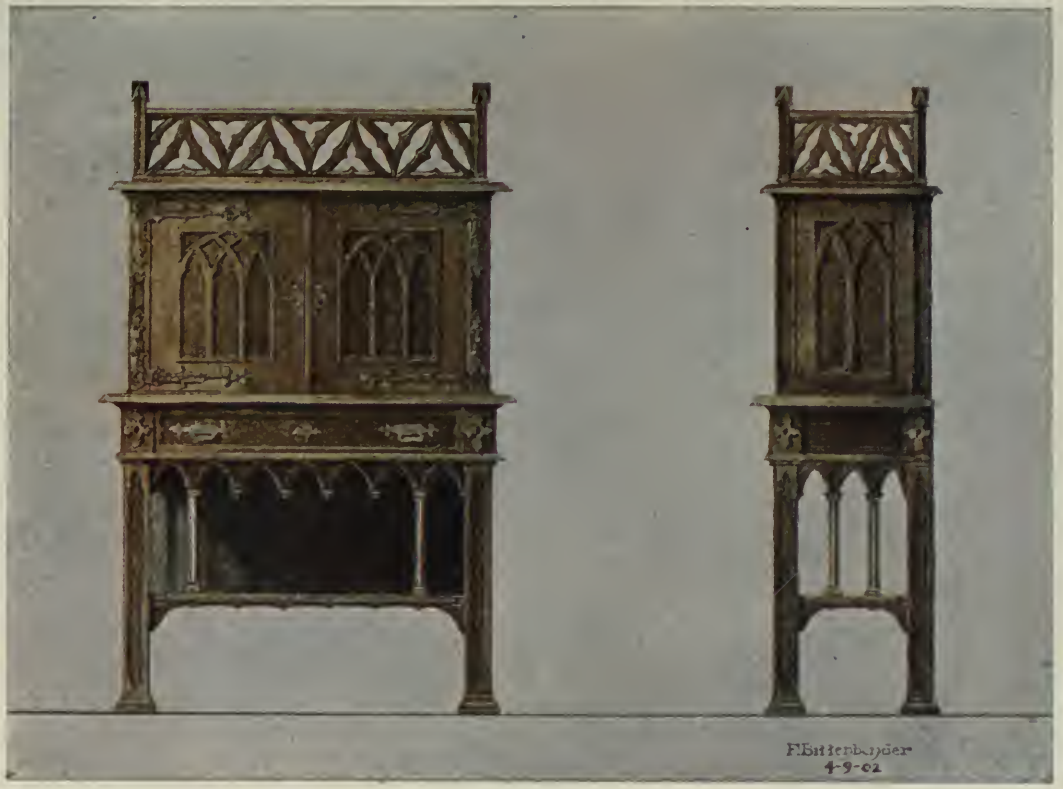

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Fig. 24

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Fig. 26

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Fig. 27

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Fig. 28

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FIG. 29

then be wiped out with a wet brush and the deeper tones put in broadly with another wash. In this way study each fold. Note how the largest mass of light near the middle contrasts with the largest mass of dark, the shadow to the left of it. Give this part your particular attention; make it the center of interest. Note, also, how the two little accents of dark at the bottom stand out as the chief darks in the drawing; use them as a gauge by which to measure the value of all other darks.

The three colors used throughout this drawing, when properly combined, form grays that are easily managed, especially in light washes, and although the hues employed are quite varied, there should be no difficulty in matching and applying them. If any part becomes muddy or if the drawing becomes lost, carefully sponge it out without disturbing the remaining parts, and paint it in afresh, trying to avoid the cause of first difficulties. The background is made with a wash of the same three colors. If possible, arrange a piece of similar material and observe it studiously from various points of view, noting how the change of position affects the appearance of both color and texture. When observed from the side opposite the source of light, the contrasts are strong and the lights fairly glitter; while when viewed from the light side the effect is exceedingly soft and delicate. The present study was made from a point at about right angles from the source of light, from which point the effect is usually the best, as the masses of light and dark are, as a rule, better distributed.

15. Our next study, Fig. 20, is a piece of cotton drapery (cheese cloth), of a light, violet hue, arranged on the lay figure. The figure is arranged in a sitting posture in order to give greater variety of planes. Note the three large divisions: first, from the neck to the hips, a vertical plane; second, from the hips to the knees, a horizontal plane; and last, from the knees to the feet, a vertical plane. The large mass of light falls on the horizontal plane; observe how the interest centers in this spot and how the eye

unconsciously comes back and dwells on that centered high light. The upper part of the figure fades gradually into the background, both in color and in tone; this, with the soft, greenish, reflected light on the right side and the shadowy suggestions of arms at the sides, gives a peculiarly realistic effect. We cannot help but feel that it is an object of three dimensions. From the very first wash, begin to carry out this feeling by suggesting the changes of plane. Use the same three colors as in the last study for the beginning and get a tone over the whole figure equal to the high lights of the various planes. This should form a suggestive ground on which to work. The larger soft darks should next be painted, accenting still more the changes of plane; use for these darks crimson and new blue, modified slightly with emerald green. In the larger masses of dark, subtle gradations of tone and color occur in one wash; this is nicely shown in the fold that hangs from the right knee of the figure to the foot. Mark how the dark increases as it approaches the lights toward the bottom, lightens and becomes redder in the reflected light on the inner plane of the fold, and gradually melts into the deeper shadow again, changing into greenish gray. These soft gradations are characteristic of the shadowy parts of soft cotton drapery. Stronger color may always be added to a wet wash. In the upper left-hand corner of the drawing, the dark touches are put in while the under wash is still wet; if a very soft-edged dark is wanted it must be put in soon after the first wetting, but if some definition is required the under wash must be partially dry. Practice will enable one to know just when to do this; although it is next to impossible to accurately copy washes handled in this way, we may get the spirit of them by following the same method.

Note that there is no lack of definition in the parts approaching the lights; many of the washes are here left with clean, sharp edges, but a gradation is made by interposing a tone between the deeper touches and the lights. Before putting the finishing touches on the drapery, carry the first wash of greenish gray over the background and let

it go over the upper part of the figure to the waist, over the suggestions of arms, and blend into the drapery on the shadow side; use new blue and yellow ocher for this. In the deeper washes some Prussian blue may be added, also burnt sienna.

The whole treatment of this drapery must be free and suggestive. If not successful with any part of it in the first effort do not hesitate to wipe out that part at once and try again. Remember that a partially sponged-out painting makes a sympathetic ground on which to work again, and this is especially so where softness and a certain air of mystery are desired.

16. The fourth drawing on this plate, Fig. 21, part of a window seat with pillows, shows a variety of colors and textures. A similar study might be arranged in any home. The strong light from the window falling across the couch and near pillows, while the other end remains in shadow, lends somewhat of a picture element to the study. Sketch the drawing twice this size. Begin with the yellow curtain, the large divisions of which can be laid in with gamboge and a little orange for the lights, and orange grayed with new blue for the darks. The brown pillow may then be painted with burnt sienna and gamboge for the lights, and this grayed by the addition of new blue and crimson as the dark corner is approached. No account should be taken of the detail in this first painting, the desire being to express the rotundity of the object.

The green pillow may be painted next with a first wash of Prussian blue and yellow ocher, as this color best expresses the rather opaque, soft green of the old faded denim. The shaded lower plane may be put in with quite decided purple. The pillow in the shadow is washed in with yellowish gray, darker than the green one, thus establishing at once a contrast of tone. The suggestion of shutters is painted with Vandyke brown, crimson, and new blue; the dark-green wall in shadow with Prussian blue, gamboge, and crimson. The top of the couch is rendered with a light wash of

gamboge, crimson, and new blue, which should be increased in strength and carried over the front plane. A wash of burnt sienna and new blue can be used for the floor. The light edge of the woodwork to the left is painted with Prussian blue and gamboge, and its shadow side with the same colors grayed with crimson.

This covers all the ground. The high lights on the brown pillow should now be carefully wiped out, the dark corner strengthened, the dark accents put in, and the surface softened and broken by wet touches of the lighter color; the material represented here is velure. In the denim pillow, the forms of the light and dark are more definite, as are also those in the back pillow, which is covered with a thin, silky material. The local color of this is much the lightest of the three, but when seen in shade it appears much the darkest. After the pillows are worked up into correct relation, the curtain, couch cover, and floor should be painted over again, and the cast shadow on the floor and the detail of the woodwork rendered.

The student should have no trouble in analyzing and matching the colors used for the finishing touches; in fact, a good deal of freedom may be employed, it being not at all necessary to use identically the same colors as were used in the original to produce an effect just as good. Make out of this study as much of a picture as possible.

DRAWING PLATE, TITLE: FURNITURE

17. The rendering of common articles of furniture in color forms part of the students' training in all technical schools. The importance of this subject is shown by a glance through a few illustrated books, or a tour through any picture gallery or exhibition, with an eye to the furniture used as accessories, where interiors are represented. A conscientious painter or illustrator uses models for his furniture with as much care and fidelity as he does for his figures and costumes; if the setting demands the use of a certain historic style, he makes himself familiar with that style, often spending much time hunting through museums for the desired

Fig. 22

object from which to make sketches. If he can afford it, he surrounds himself with quaint and decorative bits of furniture, picked up from time to time; this is one of the features of a successful artist's studio which makes it a delightful place to visit. Fig. 22 shows a corner of the interior of such a studio and the student may observe what a varied collection is there gathered together.

The common articles of furniture in every-day use in every household will be found interesting subjects of study, and should be used as models. Draw the ones most interesting in color, rendering them faithfully in the manner described. Interesting grouping may be attempted and a pictorial element thus introduced.

Old-fashioned articles of furniture are dear to the art student, especially those belonging to the Colonial period, a time that has recently been so beautifully reconstructed and represented by some of our best modern illustrators. The quaintness and simplicity of the forms, the richness of the color and material, and the evidence of good, solid workmanship in the construction of the articles are points that appeal to the artist; and what studio or art school but has a few of these precious old relics of a delightful period for use as accessories or studies.

18. Fig. 23 is a study of an old walnut spinning wheel, one of the most delightful forms of the old furniture, though a rather complex object to draw. Note the color and the broad, free handling. Interest is centered in the wheel and its nearest supporting post, and there the color is richer and more varied. In the receding parts the color is cooler and the forms are not so strongly modeled; this increases the appearance of reality, making the nearer parts stand out. Like most furniture it has a polished surface, which accounts for its many shiny lights and its play of color. Though the object is generally brown in color, blue and bluish gray are seen in many parts. We know this to be the reflection of a bluish light, probably the sky, and may expect to see the same bluish light on all dark furniture when illuminated by

daylight. The table and the rocking chair are evidences of this. Four colors were used to render this object: new blue, crimson, burnt sienna, and Vandyke brown. The grays are made by combinations of brown and blue. For the background a touch of Prussian blue and of yellow ocher will be needed.

This cut is reduced to about one-fourth the size of the original drawing.

Fig. 24 represents an original design by a student for a desk in the Gothic style. It is drawn in front and side elevation, and has an arbitrary color scheme representing oak. Designs for furniture are usually rendered in this manner. The drawings show a plan and two elevations, as in Fig. 25, or occasionally two elevations only, as in Fig. 24. It is well for the artist to become familiar with the rapid sketching of such details in simple elevation instead of in perspective, as greater accuracy can thereby be attained and the sketches can be redrawn in perspective at any time they may be needed as accessories in a picture. For practice, take any piece of furniture, such as an old chair, bureau, desk, or table. Carefully sketch two elevations of it—or three if necessary—and then render it in color, endeavoring to secure the general effect rather than the details of light and shade. If the principal measurement of the object now be marked on the sketch, it will serve for future use quite as well as would the original object and is usually much easier to obtain. Fig. 25 shows a plan and elevation of a hall chest, in walnut, with carved ornament in Italian Renaissance style. In this case the plan is introduced in order to show the construction of the chest, the projection of the moldings, etc., and would be necessary in any design intended as a guide by which the chest was to be constructed. For general art accessories, however, the elevations alone are sufficient, unless the object is very irregular in plan.

The subject of furniture design cannot be touched on in this Section. These examples of rendering by pupils are inserted to show that there is such a branch of craftsmanship,

DESIGN for a HALL CHEST

Scale 1½"-1'

Front Elevation.

End Elevation.

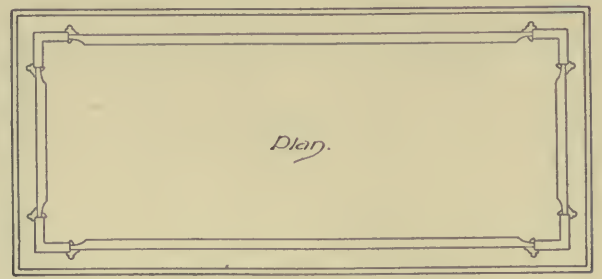

FIG. 25

and that the rendering is similar to that made from the object. The designer, therefore, must be familiar with color, with rendering, and with the appearance and color of the various woods employed in furniture manufacture. His sketch must be truthful enough to fairly represent the finished article.

Before beginning the rendering of the next plate, consider the relation of this subject to the two immediately preceding. A piece of furniture is only an object, more complex in form than the single objects that have heretofore been painted, and its rendering involves almost identically the same problems that were then met with. There are varieties of textures to represent, though the polished surface is most common. Textile fabrics are so intimately associated with furniture, both as part of the objects—as in upholstered articles—and as accessories, that the knowledge of their texture already gained will be found very useful.

The details of furniture are often very trying and require much patience, especially the common chair, which has many small spindles. Some students are inclined to loose patience over the drawing of this unprepossessing but indispensable article. But patience finally rewards them and when one has mastered the perspective of the legs, the peculiar foreshortening of the irregular seat and the curved back with the spindles, he is prepared to meet any problem in the drawing of furniture. This applies to rendering also. One is inclined to turn with relief from the painting of small things to those having large, simple masses, but the training received in this work, which is so exacting, fits one for the broader and more pleasant things to come.

19. The four subjects chosen for the drawing plate are made from articles common to almost every household, so that similar objects may be observed and rendered for practice. The first subject is the study of a common oak armchair with a green cushion, Fig. 26. With the golden yellows of the oak and soft, yellow green of the cushion, one naturally looks for an association of purple grays, which are sure to be

found when these colors are involved. This purplish gray not only adds to the appearance of reality, but completes a very pleasing harmony; it is evident both in shadows on the cushions and on the woodwork. Note its appearance on the nearer arm of the chair, which is slightly polished and reflects the background color. The cushion is of lusterless cloth, such as denim, and, being somewhat faded, shows quite a range from cool to warm green, which makes it much more interesting than if it were one color all over. This accidental color may be slightly exaggerated to emphasize the principal point of interest.

Sketch this figure in pencil, making it about 10 inches high. First paint the washes on the woodwork. Start with the uprights of the back and note the difference in strength between the near and the far post. Leave the little high lights at the top. Use yellow ocher, gamboge, and burnt sienna in the woodwork, modifying the yellow with blue and red for the dark parts. Where the tone is not too dark, as in the horizontal member at the back, the gray spindles, and the light planes of the arms, try to secure it with one wash. Suggest the rounding of the post and spindles, as far as possible, in the first painting by adding some of the purple to the dark side while the other color is wet; this may be strengthened in the second painting. .Paint a wash over the background and floor before the final painting of the woodwork, and also render the cast shadow. The soft greens of the cushion are best made with yellow ocher and Prussian blue, and if the purple is touched in while the first wash is still damp it will be sufficiently grayed by mixing with the green. Observe that the cooler green is at the back part of the cushion; this helps to make that part recede. The very darkest accents in the drawing will require Prussian blue and crimson, as the new blue is not powerful enough to give deep tones.

20. The second object on the plate, Fig. 27, is an old, upholstered rocking chair of mahogany. The dark-red and purplish tones of the wood form a pleasing contrast to the

rich greens of the velure upholstery. The low seat and the peculiar curve of the spindles forming the back give the chair a very quaint appearance. After making a careful drawing about 10 inches high, begin with the green, as it forms the largest masses. Put on the first washes as directed in the rendering of the velure, noting carefully the variation of hue from yellowish to bluish green. Use gamboge and Prussian blue, and when necessary modify the green thus produced with a touch of crimson. After wiping out the soft lights, leave these parts and proceed with the woodwork. Too much insistence cannot be laid on the fact that the color continually changes; one end of a surface may appear red while the other appears green, as is the case in the brace under the right arm of the chair, the upper part being at the proper angle to reflect the green from the seat. Note the difference in color between the front spindle and the edge of the seat directly above it; although their local color is identical, their position in reference to the light makes one quite red while the other is distinctly purplish above and yellowish beneath, due to the reflection from the floor. The proximity of the green cushion gives a reddish hue to the edge of the seat under it, by simultaneous contrast. The rockers recede both in color and in tone, which helps the appearance of reality.

Match the purplish reds with crimson and new blue and gray this by the addition of yellow where necessary. Begin with a small brush and put a wash over all the spindles of the back. Avoid the high lights, which it is safe to leave a little too wide. The edges of these lights may be left quite sharp and softened afterwards, where desired, by gently scrubbing with the bristle brush. Get a wash over all the woodwork and let this one wash suffice wherever possible. Next paint the cast shadow on the floor, then put a wash over the background and the floor; all these grays may be matched with the red, yellow, and blue. When the whole drawing has been covered by the first painting, go back to the beginning and put on the finishing washes. A good deal of the reddish purple may be added to the green for the shaded parts.

21. The old mahogany table, Fig. 28, has been selected for a study on account of its rich color and simple masses. It shines and reflects like other polished objects. Observe how the reflection of the gray wall has neutralized the red local color of the top, which, however, grows stronger as it approaches the light and the eye of the observer. The blue reflections on the dark base are more intense than those on the rocking chair, but they are not bright high lights; the angle was such that only a hint of the sky color was reflected and not its full light. This sort of bloom is often noticeable on dark furniture. Dust is a factor in the color appearance of objects. A coating of it upon a surface will entirely overcome the local color and, if the surface is a polished one, will reduce its reflecting power. Its effect may be readily observed on furniture that has not been disturbed for some time. Touch any of the horizontal surfaces with the finger and note how the finger mark differs in color and tone from the surrounding parts. Dust is always gray; when examined under a magnifying glass, it is found to be composed of minute particles of all colors. It is, therefore, a very luminous gray that is readily affected by simultaneous contrast. On account of this pleasing color contrast and the tendency toward harmony is this sprinkling of gray, artists often allow the dust to accumulate on objects in their studios.

This table was not dusty. It has a sufficient variety of color, however; note the reflection of the yellow floor in the vertical planes of the base and the pleasing contrast that is made with the purplish gray of the horizontal surfaces. Draw this figure about 10 inches high. Proceed with the painting by getting a wash over each surface with as much of the final effect as possible. Leave all sharp lights. The soft half lights may be wiped out. Paint the top first and work down to the cast shadow; this, being painted before the floor, is considerably softened when the floor color is painted over it. For the top, use crimson grayed with new blue and gamboge; add more crimson as the lower right-hand corner is approached. If the proper grading is not

obtained in one wash, allow it to dry; turn the drawing bottom end up and begin with the red in the corner, gradually blending out into the gray with thinner color. For the remainder of the woodwork, use burnt sienna, new blue, and a little crimson. The deeper parts may be obtained with crimson and Vandyke brown and the sharp accents with Prussian blue and crimson. The background grays are made with Vandyke brown and emerald green and the warm floor with red, yellow, and blue.

22. The last subject on the drawing plate, the oak bookcase, Fig. 29, brings us to the study of interiors. So far we have dealt with single objects related only to their backgrounds; this study begins to hint of the interior by its association of objects. We have the case itself, forming only a part of the study, the vase, the suggestion of books and the silk curtain, the wall with its two divisions and its suggestion of a picture, and the polished floor. It remains, however, primarily a study of a bookcase; the accessories must be kept in their subordinate relations. Sketch this figure carefully, making it about 10 inches high. Do not draw with a pencil the grain of the quartered oak nor any but the larger folds in the drapery; these can be more freely put in with a brush.

In rendering this study, a wash of yellow ocher is first carried over the light side of the case, and by the addition of some Prussian blue, made slightly greenish toward the bottom, which is partly in shadow. A stronger wash of yellowish gray is then carried over all of the top part, the strips at the sides and base, and the shelves. This gives at once the division of light and dark. The drapery, being a large and important mass of color, should be next washed in with yellow ocher and Prussian blue, the tones being slightly duller than the high lights toward the bottom, which are scrubbed out with the bristle brush and warmed with a touch of gamboge. The glaring white lights that stand out where the books and vase are to go are covered next. The dark touches above the books are first put in with

strong red and blue, and before these are entirely dry a brush wet with water only is quickly dragged over the back of each book, carrying a little of the purplish color with it; this gives a suggestion of modeling to the backs of the books. The local colors are then applied, the books being kept separated by a tiny line of white paper. The two divisions of the wall are then covered—the upper by rather a neutral gray, and the woodwork by a wash of somewhat darker, reddish gray, which is also carried over the floor. The suggestion of picture and frame is then painted, which finishes the covering of the surface.

Now strengthen the darks in the case, separating the planes more vigorously where necessary; add the washes that make the suggestion of grain, and put in the detail of the drapery. A little crimson should be added to the yellow and blue for the details, the shadows being slightly purplish in hue. If the light part of the oak is not yellow enough, use gamboge to bring up the color. Note that this light side of the case remains the large mass of light, everything else being subordinate. The upper part of the wall is painted over with a broken wash of emerald green and crimson, into which a little gamboge is added in spots while the first wash is wet; this is to suggest a wall paper with a small figure in tapestry effect. The wainscoting is finished with washes of burnt sienna, crimson, and new blue, the dark side to the right of the case having the detail barely suggested.

DRAWING PLATE, TITLE: INTERIORS

23. The architect or the interior decorator, and the illustrator or painter of pictures regard the subject of interiors from entirely different standpoints: the first two are interested in design and arrangement, while the last are concerned only as to the pictorial effect; the one takes account of the elements of floor, walls, and ceiling and in the rendering deals mostly with facts of color; the other picks out a picturesque bit that composes well and deals with appearances. The designer often studies one wall at a time in

ILT 153 § 4

FIG. 30

I L T 153 § 4

FIG. 31

I L T 153 § 4 FIG. 32

FIG. 23

I L T 153 § 4

Fig. 34

I L T 153 § 4

Fig. 35

I L T 153 § 4

Fig. 36

(*a*)

(*b*)

(*c*)

FIG. 39

FIG. 40

FIG. 41

(a)

(b)

(a)

J L T 153 § 4

FIG. 42

(*a*)

(*b*)

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I L T 153 84

elevation, expressing certain facts in a direct way as to the color and the scheme of decoration that he wishes to employ; he may take little heed of the light and shade effects, as his problem lies in making a harmonious scheme in division of surface and in color, in a sketch to be shown to his client and from which the decorator may carry the work to practical completion. In Fig. 30 is shown a sketch of this character. Here, the simple color treatment requires scarcely more technical skill, outside of the design, than the matching and mixing of colors and the laying of washes. When the problem involves light, shade, and perspective, it becomes a more difficult matter, as then everything must be modeled and one tone and one color will not suffice. First to be considered is the modeling of the room itself; for an effective rendering the light should come from one direction and should illuminate one wall while the other remains in shade. Shadows cast by projecting objects or furniture help the realism of the effect. Dimensioned sketches of this character are valuable to the artist in the same manner that the elevations of furniture are of value, as stated in Art. **18.**

The interiors of religious edifices, particularly those that preserve to us the ornament and the color of historic periods, are of great interest both to the designer and the painter. An important part of the training of the architect and the decorator is the careful study and rendering in color of these interiors.

The interior of a Gothic church, shown in Fig. 31, presents a problem for both the artist and the decorator. The modeling of the forms, the effects of light and shade in the perspective, and the harmonizing of the colors, required the artist's eye and hand, while the proportioning of the parts, the arrangement of the lines, the construction of the roof, etc. were details of purely architectural character. It is therefore apparent that it is quite as necessary for the artist to be familiar with the architectural details, to some extent, as it is for the architect to understand the theory of color harmony and contrasts. A well-colored picture that is architecturally incorrect will be as defective and

uninteresting as a poorly colored but correctly drawn architectural study. The study of architecture, historic ornament, etc. is therefore of great value to the artist and illustrator.

24. In order to render these drawings in a clever manner, the designer must make himself thoroughly familiar with the appearance of objects, with textures, and with the folds of drapery; he must know color and color harmony. All these things must be "in his head," for when he does not use models to any extent, he must create; he must also be rapid, for his time is limited. Figs. 32, 33, and 34 show reproductions of renderings in perspective by students of interior decoration.

A student's preparation for this branch of art craftsmanship includes, in addition to all the subjects studied, the rendering of interiors from life, the making of color schemes for, and the rendering of, interiors from black-and-white or outline drawings and from photographs. All desirous of taking up this line of work should make as many renderings of interiors as possible and try original color schemes on drawings made from photographs, etc. The painter and the illustrator find their greatest delight in the picturesque; they represent interiors either as consistent settings for figures or for the very beauty or picturesqueness of the thing itself. The illustrator must be familiar with the prevailing styles and with the historic styles of the different periods, for his work, like that of the designer, often demands original construction or composition. It is therefore advisable for the artist to make frequent studies of picturesque interiors in order that he may have them by him as accessories when he is comparing his picture or illustration. Details, such as shown in Fig. 32, are interesting on account of the Oriental coloring and the introduction of the rather elaborate tabaret in the corner. Fig. 33 is homelier and less brilliant than the former; here we have a dingy corner with a few old rags and bottles introduced to give color variety. Each of these is useful in its proper place and difficult to find in actual existence just when wanted. The mantel, Fig. 34,

suggestive of old-fashioned days, is another form of detail that studies should be made from whenever the opportunity presents itself. In fact, it is safe to say that every moment of leisure time should be devoted to the making of these simple sketches as accessories in interiors.

The picture of anything associated with the dwellings of human beings will, perhaps, never cease to be of general interest; from the dwelling of the humble peasant, where man sometimes shares his habitation with his dumb animals, to the sumptuous palace of royalty, the painter goes for his subjects. While paintings of the latter interest us by their grandeur and on account of historic associations, those of the humbler sort touch our hearts. We look to them for that mysterious quality known as the picturesque. We find this quality inseparably associated with age and decay. Man tears from nature's stores the materials with which to build him a dwelling; he erects it and surveys it with satisfaction; it is new and fresh inside and out, a fit habitation from his point of view. Nature, however, does not agree with him; she would take back to herself the materials of which man has robbed her and efface the scars he has made. Her agents, the elements, are immediately set to work and dilapidation begins; rain, wind, and frost attack the outside; smoke, dust, and dampness the inside; man, for a time, bravely resists these attacks and keeps up a running fight of periodical repairs, triumphantly saying to himself, "There! it is as good as new." But nature smiles at his pathetic patching, which only makes her work the more evident, and unceasingly, untiringly continues the work of destruction until man, becoming less and less vigilant, gradually gives up the fight and her victory is assured. It is the visible evidence of this battle with nature, especially in all things associated with man, that helps to make the quality called the *picturesque*. When the victory has been complete and man is driven from the field, we survey the ruins with deep feelings of pity while we think of the former estate; but not in ruins do we find the highest degree of the picturesque; the ruined city of the ancients, the ruined and

deserted home of the humblest of men, while full of pathos, lacks the interest that we find in the habitation that shows the ravages of time but is still occupied by man.

It remained for the peasant painter Millet to reveal to the hitherto unappreciative world the picturesque charm of the peasant's home and his life. The Dutch painters of today and others continue to give us charming pictures of interiors, especially those of the Dutch peasants and fisherfolk. In the workshops of men as well as in the homes we find the same picturesque quality and interest; in the mighty steel plant and the familiar blacksmith shop of the cross-roads, the great modern factory and humble cobbler's shop, the artist finds delightful subjects for study. The old blacksmith forge shown in Fig. 35 is an example of what may be found in nearly every village. Our cities and towns are full of workshops, little and big, that contain just such picturesque bits as this.

25. Let us look at this drawing critically; it is a good subject to illustrate the difference between a study and a picture in its strictest sense. In the first place it is essentially a study and not a picture. A *picture* should have but one center of interest; this *study* has at least four: the anvil and block, the barrel, the forge, and the window. No matter how cleverly each one of these might be treated, the result cannot be a picture in the truest sense of the word. There is material here, however, for the settings of several pictures; we have but to give free play to our imagination to see the blacksmith at work at his anvil, the light streaming in from the door at the right, while that from the window is more subdued; the forge with all its detail is subordinated into a suggestive background; the interest is at once centered in the man and his work at the anvil, or the picture may be one where the light from the door is shut off casting into gloom the foreground, the anvil, the front plane of the forge, and the barrel; the blacksmith bends over the glowing forge, his figure partially illuminated by the cool light from the window and partially by the warm glow of the fire, which

is so bright that its light predominates over that from the window and becomes the chief light of the picture as well as lending the dominant color note in its orange glow. Those who have observed the effect of this combination of colored lights, firelight and daylight, lamplight and moonlight, know the peculiar charm of color that it lends to objects, irrespective of their local color. It is a favorite subject of study with artists and is seen in many pictures.

26. The rendering of this subject is pretty well explained by the two stages of painting shown in Figs. 35 and 36. Although many objects are to be represented, the drawing will not be found difficult, for there is hardly a straight line or a perfectly clear-cut edge anywhere. Both the drawing and the painting should be as loose and free as possible; this is necessary in order to secure the appearance of age and wear and accumulated dust. The old window had probably not been touched for over 40 years, the sill was covered thick with yellow dust that had accumulated in piles at the corners, the spiders had done their best to destroy the straight lines of the sash, and the glass was covered with a translucent film of opalescent color. Here was nature working for harmony. The old stone forge had been plastered and whitewashed at some remote period of its history, but much of this had worn away and the mortar had departed from between the stones, leaving soft, rounded edges. Dust had settled on every tiny projecting plane of the rough surface, and to this much of the color was due. The soft gray green contrasts nicely with the purplish grays that prevail throughout the remainder of the study. Sketch this figure about twice this size and begin the painting with the wash on the dark wall, which should be started at the top (using crimson, Prussian blue, and Vandyke brown) and carry it down on both sides around the chimney and the window. On the chimney side the wash is darker below, but on the right of, and below the window, it is lightened and the color made warmer by using burnt sienna instead of Vandyke brown; some emerald green should also be worked

into this wash in the lower part. These colors must not be all mixed together, as muddiness will result; touch them together loosely in the paint box, or better still, flood one into another on the paper. The forge on the one side and the barrel on the other form stopping places for this wash; it can be blended out with clear water where a hard edge is not desirable. In this case the colors of the forge are laid in as a continuation of the upper wash except where a definite edge is to be left. The same colors as above, in lighter tones and continually varying, are used throughout the lower part. The large washes are carried around the anvil and block, which are painted afterwards. For the chimney and the hood, use emerald green with crimson and burnt sienna.

Always try to secure the proper relations of the masses in the first painting; in other words, make the tones hold together as much as possible as you proceed. It would be a mistake to allow the floor or the chimney to become darker than the wall. It is always safer to leave the lightest parts to be painted last; in this case, the window and the lights on the anvil and the chimney have been left white. Light forms that have been accidentally covered may be brought out by "scrubbing."

After the painting has been carried thus far, there remains only the truing up of the relations, the softening of edges, the breaking up of washes that are too clean (such as the floor, which ought not to appear swept or polished in this case), and the addition of detail. If the drawing is first worked into the condition shown in Fig. 36, one should experience no difficulty in reaching a satisfactory second stage, as a careful comparison of the two will make evident just what steps are to be taken. If desired, the plate may be sent in for preliminary criticism after it is carried to the stage shown in Fig. 36, and then finished when returned.

DRAWING PLATE, TITLE: LANDSCAPE

27. The study of landscape from nature is not only one of the most delightful and helpful branches of art education but it is the most healthful, inasmuch as it keeps the student outdoors and is likely to give him considerable exercise. It is a strange fact that landscape painting was not considered of much importance until the present age. Thomas Gainsboro, the English painter, was about the first artist to give it any considerable attention, for up to his time landscape was simply used as accessory to figures and portraits. He painted landscapes for their own sake and made figures and other details subordinate.

The observance of color out of doors is much the same as within doors, but one has to take into account the subtle coloring influences of the atmosphere and colored sunlight, and to be particularly careful to paint objects as he sees them instead of endeavoring to render them as he knows them to be. The effect of the atmosphere in landscape effect is to change the color according to the amount of moisture that the atmosphere contains; in a very dry community color influences are very slightly affected, as is well known in connection with certain landscapes in the Rocky Mountains. Even in the eastern part of the country, on a fine day, a tree one-half mile away may appear very distinctly modeled and quite green in color, but a day or two following its tone will have changed to a bluish gray without any sign of modeling or detail, except on the edges, where the leaves blend into the sky in a spongy mass.

Observe, in Fig. 37, how sharp and distinct the trees in the distance are profiled against the sky. The foliage of many of them is quite as distinct as the large elm in the foreground, but in Fig. 38 quite a different condition exists. A haze rising from the ground obscures not only the delicate lights and shadows of the trees but also all of the detail except their general outlines, and they appear simply as spongy masses, while the tree in the foreground is but slightly affected. It requires close attention to observe

and reproduce the actual appearance of objects, instead of endeavoring to represent them as they are known to be.

28. In drawing Fig. 38 from nature the tendency would be to render the distant trees with nearly as much detail as the one in the foreground. for knowing that they are similar in structure one deceives himself into believing they appear quite as clearly as those in Fig. 37. Smoke and dust also obscure the outlines of objects in landscape and often affect their color, but these are not so lasting as the effects of fog, and therefore need not be taken into account, as a general thing.

The most delightful times of day to represent landscape work, both on account of the soft outlines and the delicate colors, are morning and evening, when the atmosphere is most affected by moisture and the sunlight is most eccentric in color.

It is evident that in order to gain a mastery of nature one must be content at the beginning with a study of her less subtle and less transitory effects. After the observation has become trained and keen from much practice, the study will contain more difficult and more delightful phases. This plate shows the more familiar aspect of objects as they appear in full daylight. The range of colors given are ample for this line of study, but for the portrayal of a sunrise or sunset other colors will be necessary to produce special effects.

One must learn well to study from nature before attempting landscape work. Studying indoors gives good practice to the eye and to the hand, but objects that will stand still indefinitely and remain unchanged as long as the light is unchanged can be drawn out leisurely and no particular haste need be attempted in order to portray them, but outdoors matters are quite different. The light is trying to the eyes and constantly changing, and therefore likely to deceive the artist. Then the question of subject comes up—how much of what we see shall we paint. This is one of the most perplexing questions to the beginner, for composition is of the utmost importance in outdoor study. One object

Fig. 37

FIG. 38

will form a picture; a number of objects may form the subjects of a study. When attempting to form a picture, the principal object must be well balanced on the canvas and surrounded by minor details that in no way detract from its importance.

29. **Sketching** is the term applied to a sort of shorthand rendering of effects or objects as we see them; it is a brief record of a pleasing combination of color masses. The beginner does not make sketches, for, the ability to make them implies a knowledge of details that can be acquired only by long study and observation. A study differs from a sketch inasmuch as it requires more time and goes farther toward completion; it tells more literally the story of what is before the eye. It is a record set down with painstaking care, whereas the sketch is readily placed on the paper and its use in a future composition is dependent on the artist's further training and actual knowledge of conditions that are unnecessary to record. The study lacks the dash and spirit of the rapid sketch as well as the clever and painstaking finish of the picture, and is a medium through which one must arrive at the other two.

The landscape painter makes many studies and sketches from nature, but very rarely finishes a single picture outdoors. The picture is usually made, from the studies, in the studio at home, perhaps after the study season is over. There the artist may take his time under the best conditions of light, and supply what his sketches lack in detail and effect from a stock of stored-up observations in sketches or studies or from his memory.

The drawing plates used in this Course are necessarily studies. None of them is sufficiently crude to be considered a sketch, nor sufficiently finished in composition to be called a picture. They are accessories that may be combined to form a picture, but are not pictures in themselves.

30. In Fig. 39 are shown three sketches, the originals of which were hurriedly made one morning on pieces of paper $3\frac{1}{2}$ inches by 6 inches. They record the impression of

sunlight in the middle of the forenoon. No attempt is made to detail the foliage or the buildings, but simply to show the effects of colors in this brilliant sunshine. The masses are expressed in broad, flat washes, a single wash being sufficient for each one in many cases. The color and the relative tones of the masses, as well as the characteristic forms of the different trees, are the only details that have received attention.

(*a*) is a memorandum of a country road over a bridge, with sycamore and willow trees casting a shadow over the road at the bridge. Beyond this on the left are some soft, gray willows. The high light is on the masonry of the bridge railing. The sycamore tree in the foreground has a decidedly yellowish-green hue while the ground is lighter than the tree. The small willow in front of the sycamore is a purplish gray and the roadway a light tint of orange. The shadow on the road is a purplish gray, the distant trees are a bluish purple, and the distant road and grass much paler than in the foreground. The sky is a pale blue with soft, yellowish clouds. Thus, the sketch records more realistically and satisfactorily the actual conditions of light and shade and color that exist in this little piece of country roadside than we could express in words or descriptions. The other two sketches, (*b*) and (*c*), are simply repetitions of this one and can be much more readily made than any other form of notes. Thus, we see that the sketch is a simple memorandum of existing conditions.

Fig. 40 is a study, made in the early spring time, showing an arched stone bridge and a little stream in the foreground. The color and light are here subdued, while the greenness of the grass and the scarcity of foliage are strongly suggestive of the season.

Fig. 41 is a study of a road going up a hill past an old-fashioned plaster house; it was evidently painted in the early morning. The problem in this case was to make the road appear as though it came toward the observer as it descended, instead of extending as a perfectly flat plane in front of him. This has been accomplished by increasing

the amount of color and effective detail in the foreground and by so drawing the lines as to get the effect of a receding plane. The blue gray of the distant trees is nearly the same in tone as the shadows on the road; this color forms a pleasing contrast with the warmer tints of the sky, the house, and the road. There are no crude greens in either Fig. 40 or Fig. 41, and the whole is worked up much more in detail than any of the sketches in Fig. 39.

31. Most open landscapes can be divided into four elements—sky, distance, middle distance, and foreground. The composition of the picture depends on the placing of these masses so that they balance well; to overlook this important detail spoils the picture, no matter how well the different parts have been executed individually. A good way to judge the appearance of a picture is to carry about several cards about the size of a postal card, in which small rectangular openings of different proportions have been cut. One of these cards held in front of the eye will screen all of the landscape except that which may be observed through the opening, and thus the amount to be included in the picture and the proper balancing of its values and tones can be better determined than where the whole landscape is spread out at one time. Differently proportioned rectangles should be tried on the same landscape and adjusted both horizontally and vertically, to observe not only which is the more pleasing but also the relation of the lines and masses of the picture to the lines of the frame.

Nearly every landscape contains a horizontal line where the sky and distance or where the distance and ground meet. If this line is decided, like the horizon line of the ocean, it should be placed well above or below the center of the picture, for if the picture contains two equal masses of sky and foreground, the interest is evenly divided between the two and the picture loses in effect. When apparent, this line should be the first thing placed in the picture, as one can judge from its position about how the finished composition will look. If it is desired that the picture

shall have the appearance of a hill, like Fig. 41, the horizon should be placed well toward the top of the picture, thus admitting very little sky. If the sky is an important thing, the line should be placed low. The important upright mass should not occupy the center of the picture or a position not too near the edge, and the lights and shades should be balanced so that neither one nor the other appears to occupy all of the important position on either side of the center of the picture.

32. The chief concern of the student is with the color appearances and the effects in nature. He must learn to reduce what he sees to its lowest possible terms before putting it in color. He must eliminate all thought of detail and try to see the elements in simple, flat masses of color, thinking of them rather in the terms of his water colors than as they are; that is to say, a distant lot, tree, or house should appear simply as an irregular mass of color and not as what it really is. A clear sky is simply a wash of pale blue graded into pearl gray as it approaches the horizon. A distant bank of woods is a wash of bluish purple that is much darker than the sky. The ground is simply a graded wash of a given color, light in the distance but deepening as it comes forwards, the purity of the color increasing as the foreground is approached. The trees or other objects that form the middle distance are washes of more positive color, while the foreground is usually a mass of rather dark, prominent color, more detailed in the end than some of the distant elements, but, nevertheless, a mass when considered in the picture.

In Fig. 42 are shown four studies treated in this simple manner. At (*a*) is represented a little stone arched bridge overrun with vines. The foreground is in shadow, with gray-green banks of grass and leaves. The sunlight strikes one edge of the bridge, which is thrown into relief by a mass of purplish-gray trees beyond. Care has been taken to match the values and to strike the color as nearly as one flat wash will allow. Both in this sketch and in that shown at (*b*) the

treatment is simple and almost poster-like in effect, and could be printed very readily from single blocks without gradations. The sketch (*b*) is of a freshly painted house. Its sunlit end is strongly contrasted with the dull-red roof and the dark-green maple tree beyond, although both of the latter are in sunlight also. These values can best be judged by closing the eyes almost entirely and peering steadily between the lids toward the object it is intended to portray. In this way much detail is lost, masses of light and shade bring themselves into greater prominence, and the true values of color become more apparent. After studying the object in this manner, mix a wash as closely as possible to the color that is to be laid flatly on and compare it with the color of the building, again partly closing the eyes. The original sketches, (*a*) and (*b*), Fig. 42, were 4½ inches by 6 inches, and not over an hour was spent by the students in the study and execution of each.

The subjects (*c*) and (*d*), Fig. 42, are more elaborate, introducing tree forms at varying distances and of different hues. There is more detail and more evidence of skill in the handling of the washes in these two studies, which begin to show the grading from one color into another without hard edges, as was the case at (*b*). In (*c*) a cloudy sky has been suggested by simply using two tones. The foreground of (*d*), where the reddish and purplish gray blend softly with the warmer tints, still preserves a fairly definite form; these represent foundation washes on which the rest of the work is built up.

33. In making a water-color sketch from nature, learn first to treat the general landscape as all other subjects; the suggestive wash is first carried over each figure of the sketch, giving to it the proper tone and color as nearly as our skill in observation will allow; the second painting then follows. Work up and elaborate various details and improve the tone relations until the whole is suggestive of what the intended work must be when finished. In doing this, as in all other cases of drawing, it is better to work up too little than too much.

In all landscape work, the sky should be considered as the under surface of a dome that changes in hue from the zenith to the horizon. In a cloudless sky this gradation is from a transparent blue above to a pearl gray at the horizon, which varies materially with the amount of moisture in the atmosphere; this gradation should be carefully observed, otherwise the sky is likely to appear like a vertical screen or plane hanging behind the rest of the picture. When the sky is cloudy, this arched effect is made much more evident by the gradual foreshortening of the clouds as they approach the horizon. The large, white, fleece-like clouds that float across the zenith of a blue sky are not so bright when low or near the horizon; in some places they are yellowish in lights, while in others they are varied by hues of gray, in the shadow portions, that often softly melts into the blue of the clear sky. When high in the sky they may be represented with white high lights and more sharply defined edges. Clouds are of much interest because of their great variety of forms, their color, grandeur of masses, and wondrous structure and texture.

34. Fig. 43 shows two cloud studies in which the landscape is barely suggested in the foreground, and is introduced merely to show the relation of the sky and the horizon. At (*a*) the sky is comparatively clear in an afternoon light; the color of the sky and clouds grades off as it approaches the horizon, the blue becomes greenish and then gray, and the clouds take on the softening gray of the atmosphere. A sky like this may be painted by applying the graded wash with a large brush as quickly as possible; no account is taken of the cloud forms. The brush is then rinsed and dried by a rapid shaking, and the high lights, or white portions of the clouds, are wiped out while the paper is wet. This occupies but a few moments and makes it possible to catch passing cloud forms, no matter how changeable they may appear to be. The local color and the modeling of the clouds may be painted in at leisure. Should it be desired to sharpen the upper edges of the clouds, another light wash of blue may

be applied to the upper sky, but care should be taken not to make the outlines too hard.

The painting of skies, like everything else, must be done with a view to expressing their general character rather than the detail. Cloud forms are too transient to allow of exact representation, and it is perfectly proper in any composition to alter the form and position of any clouds, if by so doing the composition is improved. Clouds should appear to float in the air. When they prepare to fall they melt away slightly at the lower edges, as shown in Fig. 43 (*b*). This is a characteristic rainy-day sky and is very skilfully managed. The gradual losing of one form into another as it approaches the horizon and the beautiful variations of delicate gray are suggestive of an approaching storm. These grays are produced with red, yellow, and blue, and are applied after the surface of the paper has been moistened with a sponge so that no hard lines will exist. The distance is the part of the landscape most strongly affected by the color of the atmosphere, and much of the pleasing effect of the picture is dependent on the skilful handling of this detail; therefore, it should be carefully studied.

35. Different planes of distance must often be expressed. These are usually kept distinct by their varying hues and degrees of contrast as expressed in their forms; remote distance is best expressed in flat washes of bluish gray. The beginner is apt to misjudge values and make strong contrasts of tone in the distance; he is also likely to misjudge the color, and forgets to compare it with the nearer parts of the same scene. The skilled artist, however, cannot afford to represent all that he can see in any feature of the landscape. He has early learned to sacrifice for the sake of simplicity, and recognizes the charm that the suggestive, semidistinct outline possesses and endeavors, by its use, to infuse a quality of mystery into his painting. At first make the distance very flat and decidedly blue; the greatest error that can be committed in this direction will be to make it to appear too distant, but you can afterwards build it up and bring it forwards until the right tone is obtained.

Objects occupying the middle distance, such as trees, buildings, etc., must be studied by themselves as well as according to their relations to the whole subject. Tree forms and foliage demand much study, and although they are difficult to master they can be satisfactorily portrayed after practice and persistent effort. In studying trees or groups of trees one should stand at least three times the height of the tree away from it, and then consider it from the same points that he would consider any other object of which he is to make a drawing or water-color sketch. Its form, texture, and color must be noted, for in these lie its whole character. These characteristics change, of course, with the seasons; at least they do in some latitudes, and it is largely by representing this changed condition that one gives expression to the different seasons in his picture.

It should be borne in mind that trees are not always green, and also that trees never appear all green. The observance of any ordinary tree in bright sunlight will show that many of the shining leaves reflect the blue from the sky and appear almost white; others, penetrated by sunlight, are vividly yellow, or light green; while still others, cast into the deep shade, appear almost neutral gray.

Color harmony teaches us that when blue and yellow are mingled in small particles, gray is produced, and not green. Because of this fact it is impossible to produce a good effect by painting trees in several tones of green; modified colors must be used, both for the light and the shade. In trees, as in all objects, one may expect to find the shadows contrasted with the lights in color; therefore, when the light in the tree is a yellowish green, the greens in the shadow portions must necessarily have a violet tinge. The trunks of trees are usually of various tones of purplish gray, often deep in color when they are in deep shade, but under no circumstances are they black.

36. Buildings and other architectural details, when introduced into landscape as subordinate features, do not require especial attention. They are usually rendered in flat washes,

and there is no great difficulty in determining their color. Old and dilapidated buildings require some special attention in order to get the proper hues where the brick has become stained by age or where moss has accumulated on the stonework and shingles. Moss due to constant dampness and decay varies in appearance from that due to a dry or more barren decay, and attention should be given to the matching of these hues.

The effect of distance or perspective of the ground is usually expressed by changing the color and diminishing its intensity as it recedes. The atmospheric conditions affect the horizontal as well as the vertical features of the picture and therefore must be taken into account, even when great distance is not shown. A meadow may stretch between us and some distant tree—a matter of several hundred feet. Certainly the foreground cannot be expressed by a flat wash of green, as it grows less and less green with every foot that it recedes into the distance.

Sunlighted grass is yellow with very little green in it, and in foregrounds may be safely represented by gamboge containing a little emerald green. The shadows are cooler and more green, and are best produced by adding blue to green. In late summer the bloom on grass and weeds materially affects the color of the ground. Its reddish-purple masses are broken through the green of the foreground but generally cover the green entirely in the distance, where the eye naturally looks over a considerable mass of bloom and feels that the green of the grass is entirely hidden. The coarser texture of the foreground, due to the effect of nearness, can best be expressed by broken washes and the addition of bright bits of color in the path, stones or exposed earth, but the foreground should be kept simple. Near-by weeds or bushes should be expressed in masses and not in detail.

A path, road, or stream of water coming into the foreground lends interest both by the lines and the variety of color that is thus added. Clear, still water reflects objects with colors almost unchanged, but when the water is seen at

an angle and the clear sky is reflected into it, the nearer surface is darker in tone than the more distant; this is due to the deepening of the color of the sky toward the zenith.

DRAWING PLATE, TITLE: AN OLD LIME KILN

37. Fig. 44 represents an old kiln in bright sunlight. The study was made on a bright day late in September when the sky was intensely blue and the foliage had begun to take on its autumn tints. Note how the main lines converge in the direction of the turn in the road as it disappears over the little hill. These lines form important elements of the composition, and near this point of convergence is found the strongest contrast of tone. Features of this character always give interest to the picture and should be studied as carefully as the objects that are represented. Mix the colors and lay on the washes as shown in Fig. 45, making them much brighter than the intended work will be when finished, as a bright color can be toned down much more easily than a dull color can be toned up. The first painting should tell most of the story and be perfectly intelligible as it stands.

The sky when washed in should be carried over the space to be occupied by the foliage; new blue and emerald green should be used for this purpose, the green being added as the horizon is approached. Where the lighter parts of the foliage occur, some of the blue should be taken up with the wet brush. The foliage should be painted with gamboge, Prussian blue, and crimson. A careful study of the first painting will show to what extent the modeling and variety of color can be produced here. Crude green should always be avoided. The darker part of the surface of the kiln should next be painted with a gray made of red, yellow, and blue. The wash is started at the extreme left above the shed and carried to the broken place in the wall, changing in hue slightly all the time. It should then be washed to the edge of the arched opening, the tones of which are immediately put in, a tiny line of dry paper serving to

keep the darker color in its place. The same gray is used for the shadow on the wall and on the ground under the shed.

Next the barn should be painted with three tones: the roof lighter than the sky, the end made warm by reflection from the yellow road, and the side darker and cooler. The darker section of the right wall of the kiln should be painted first, and then the lighter portion to the left of it. The color of the latter should be carried, with slight variations, over the ground immediately below it and blended out with clear water, so as to leave no trace. All these masses should be considered as units, notwithstanding the fact that a great variety of hues have been employed. They must not be cut up into spots by changing the tone too much.

The plane of the ground should be begun with green on the sides of the roadway near the barn, and the purple shadow on the road washed into the wet green, while the road itself is painted one broad wash of yellow ocher with bits of red and green touched into it. The tints on the shed roof and posts and the bit of sunlighted wall under the shed may now be washed in, and the first painting may be considered as complete.

The working up of the second painting requires little explanation, as it is simply an expression of detail. The sky should not be touched again, but the edges of the foliage should be softened in places and the masses broken somewhat by a second wash to tone down the color. The details of the stonework should now be added, and the sharp edges softened. The wall under the shed should be darkened, and the four arched openings finished; each portion should thus be dealt with successively. The stiff bristle brush may be used to scrub out the high lights and soften the edges in places. Observe that though the foreground is somewhat broken up by the pile of rocks and the details in the road, no strong darks have been employed such as is seen in the shadow under the shed. Should too strong a contrast be introduced here, the eye will be held by this unimportant pile of rocks instead of being led to the more important features.

In rendering this plate, endeavor to produce the general effect rather than slavishly copy each wash. In fact, it will be found much more difficult to copy these washes, tint after tint and tone after tone, than to observe the general effect of the whole and work it up according to one's own idea. Give particular attention to the region around the end of the shed, as it is to this spot that the eye is led by the converging lines and the interest of the picture centers.

DRAWING FROM NATURE

INTRODUCTION

1. "Nature is the only infallible teacher in art."

"Drawing from nature is only the recording of something from her great textbook, that cannot be expressed in words."

"The eye and the hand must be trained together in order to make these records with any degree of truth."

These three simple facts, kept ever in mind, form the best starting point for the student. The instruction here given will be made as plain and direct as possible, dealing only with the simplest medium for outdoor study—the pencil.

The student should embrace every opportunity for outdoor work, if only for a short time each day. The long, summer days are invaluable, while spring and autumn offer special features for helpful work in certain details; the tree trunks and branches, and the network of twigs, and the stems in shrubs are then laid bare for a closer inspection than is possible when in full leafage. These details form most interesting and profitable study and repay the student for the time spent. Even bleak, hoary winter has days when at least a half hour can be put in to advantage. And so, the whole year round, nature furnishes abundant material for the industrious and watchful student.

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During these studies the student is working with conscious effort to improve himself, and filling the pages of his sketch book with memoranda that will be serviceable in all of his future work. It is in this way that the illustrator is ready to respond in fitting manner to ideas and sentiments expressed in writing; his notebook is a storehouse to which he can turn in every emergency.

Nature has unlimited space in which to express herself, while the artist is limited to a few square inches of canvas or paper. The student must therefore be modest in the selection of subjects, and never attempt something beyond his abilities. He should try to record only what comes within a reasonable estimate of his capacity. The beginner is usually too ambitious, and is seldom content to begin with small things, developing the fact that one little thing done well will carry him farther on his way, than half a dozen great efforts poorly carried out. One should attempt but one thing at a time, and not hesitate to begin again if not satisfied that he has made a good start. Repetition will teach one where his greatest tendency to error lies, and will cultivate patience for future use, besides. The student that follows these instructions with conscientious effort should soon reach a point where he can make rapid progress, and feel himself increase in power from day to day.

Drawing from nature is an inexhaustible study. None but the observant, well-trained student can appreciate the fascination of hours spent out of doors in this delightful pursuit. Let him always remember, that to draw well is to possess the key to all art. Even though his strong desire and hope is to be a successful colorist, he will find himself cramped in expression if he lack this essential. Let him lay this first foundation well, and the confidence born within him will lead on to endless possibilities in art.

The purpose of a teacher is to enable one to do without a teacher.

MATERIALS FOR WORK

2. Pencils.—The pencil has one great advantage over other instruments used for art work—it is always convenient and needs no cumbersome appurtenances to make it serviceable.

With a pencil and a small paper pad, or in emergency even the back of an envelope, one is equipped for sketching small memoranda serviceable for future reference in work of importance. In this way the sketcher has an advantage over the photographer with his ponderous camera and tripod, and the art student soon learns to appreciate this light and serviceable equipment.

While pencils may be obtained capable of producing several degrees of tint, from the most delicate to an intense, metallic black, only a few are necessary to cover the ground of artistic work. Three or four are quite sufficient for sketching, and as one becomes accustomed to their use, he finds that even with one he can make satisfactory general memoranda. But ability to do this is reached only when the hand has learned its cunning, and the pencil is handled with skill. Dexterity can be acquired only by practice.

FIG. 1

Speaking in a general sense, pencils can be divided into two classes—soft and hard. The finer qualities run from B (soft) to BBBBBB (very soft), and from H to HHHHHH, denoting the opposite quality and degrees of hardness. Intermediate between these is HB, signifying hard and black, a most useful pencil for general use in simple memoranda.

The student will find two grades ample for his needs. These are HB capable of being sharpened to a fine point, as shown at (*b*), Fig. 1; and BB suitable for any gradation desired. The latter should be sharpened with care, leaving

little lead to protrude, as the points are easily broken. The softer of these, the BB, may with advantage be sharpened with a chisel-shaped edge, as shown at (*a*), Fig. 1. A flat, even tint, indicative of clapboard, stone, or brickwork, Fig. 2, or long, rush-like leaves and grasses, Fig. 3, may be represented with the pencil sharpened in this manner. While there must be no shirking of careful work, yet, a short cut to secure a simple end like this need not be considered as encouraging a slovenly method of working, as it saves time for more important things.

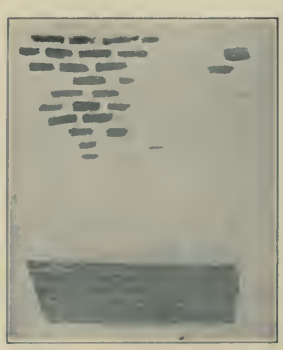

FIG. 2

Always start out with pencils ready for instant use. It is well to have duplicates in case of accident. While waiting to resharpen a pencil, some effect of light and shade worth committing to paper may vanish. To be in touch with nature, one must ever be on the lookout and ready for business. A small piece of sandpaper, or a little pad of sandpaper sheets, is very convenient for quickly pointing a pencil, although one cannot dispense with a pocket knife to remove the wood from the lead.

FIG. 3

3. Drawing Paper.—The subject of paper is largely a matter of choice, but Whatman's "cold pressed" or Strathmore drawing board is excellent for general work. Some papers of similar quality are less expensive and just as good for practice work. The individual likings of artists vary, and after a little experience the student can select what suits his

hand best. Above all, choose a dull surface. Most artists prefer a *tooth* to the paper, as it is technically designated. The slight unevenness of surface gives a peculiar effect for some kinds of work, breaking the monotony of touch, and giving a subtle rendering, at times very pleasing. But for the beginner, a moderately smooth paper will be found most satisfactory. When experience has resulted in skill, the student can profit by using different kinds of paper.

4. **Erasers.**—It is well to use two grades of erasers—a hard, velvet rubber, and a soft, pliable, or spongy, rubber; though as a general rule, an eraser should be used as seldom as possible. It roughens and frays the paper, however soft and fine the eraser may be, and injures the freshness of the original lines. Beginners in their overanxiety to receive credit for nicety, are apt to ply the rubber indiscriminately, scrubbing out all the life and character of what might otherwise deserve commendation if left to show for itself. Neatness is commendable in all work, and a smutted drawing is a difficult thing from which to hunt out the small virtue it may contain, but a spotty, scrubbed-up drawing is worse. Always bear in mind that the eraser is for emergencies, and refrain from its use as a regular drawing instrument.

The difference in the erasure of lines made with hard and soft pencils is that lines drawn with a hard pencil can be removed with a soft eraser if the paper is not indented by pressure, while lines drawn with a soft pencil invariably leave a trace of the lead. A hard pencil is intended for delicate, light work. It should never be used with sufficient pressure to cause it to produce a heavy line, as it is sure to indent the paper. Soft pencils should be used for dark lines and for shadows, as they require little pressure in order to produce this effect.

TRAINING THE EYE AND THE HAND

5. In writing, we occasionally see the pen held at an unusual angle, so there may be special exceptions to the holding of the drawing pencil. Against this there is no protest if the result be the same. Individuality and independence often give character to a drawing.

Having commenced to discipline the hand, the eye must be taught at the same time to do its share of the work. Certain shapes, in our minds, mean certain objects in the outside world. Because we know a tree is a tree, we try to draw it as we think it should look to be a tree. This idea is all wrong, and it becomes necessary to recover what has been wisely called "the innocence of the eye." Throw aside all preconceived ideas and learn to look with the unthinking ignorance of the child seeing something for the first time. Free yourself from all guesswork and supposition. Look, and put down clearly and distinctly just what you really see; namely, light and shade. If these are correctly rendered, the shapes of objects will take care of themselves. Observe closely nature's methods of producing her pictures—no sharp outlines exist, no hard formality. Note the ease and grace that characterize her forms—everything is bounded by curves. It has been truly said that nature abhors a straight line. All lines are broken by bunches of leaves, tufts of grass, or some other softening detail. Angular and crooked growths in branches and stems form picturesque bits that always make pleasing subjects for reproduction. Nature loves contrast and abhors monotony, and precision and regularity in outline are unnatural.

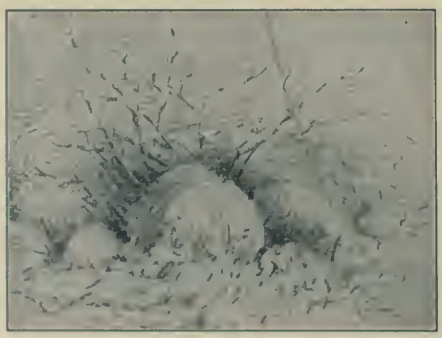

FIG. 4

Observe the beautiful tangle of weeds, sticks, and stones in some out-of-the-way place, and give the eye free range to learn from such homely details as this, and to unlearn old traditions, by carefully representing only what it sees. This does not mean a microscopic record of every stick and straw; that is impossible. Simply suggest the individual objects and represent the mass as a whole, as in Fig. 4; the eye sees it thus only, not in detachments. With such training the eye and hand labor together and grow more helpful to each other as the work proceeds.

6. Training the Hand.—As the eye and hand must always work together, both should be put in training in

FIG. 5

order to cooperate successfully. The untrained eye is eager and alert, but it does not see intelligently. The hand that in other work may be deft and clever is usually clumsy when it first takes up drawing, and must also be trained to execute readily what the eye will soon be quick to discern. It is therefore necessary that some simple exercise be practiced in order to accustom the eye and hand to cooperate. It is very important that the student should pay the closest attention to the following simple exercises with the pencil in order that he may proceed intelligently with the more difficult and more interesting work that is to come. It is not

simply necessary that the student should be able to make representations of the following few figures, but he must practice the work until at all times he is able to control his hand or arm in the sweep of the pencil and cause it to travel just as his mind dictates.

In order to produce different effects it is sometimes necessary to hold the pencil in different positions, but for general sketching it should be held lightly, but firmly, between the thumb and first two fingers, about $1\frac{1}{2}$ or 2 inches from the point, as shown in Fig. 5, much as in ordinary writing with the hand resting lightly on the little finger.

PRELIMINARY EXERCISES

7. These preliminary exercises should be executed by the student with a drawing board to hold his paper, but in outdoor work and actual sketching from nature a drawing pad

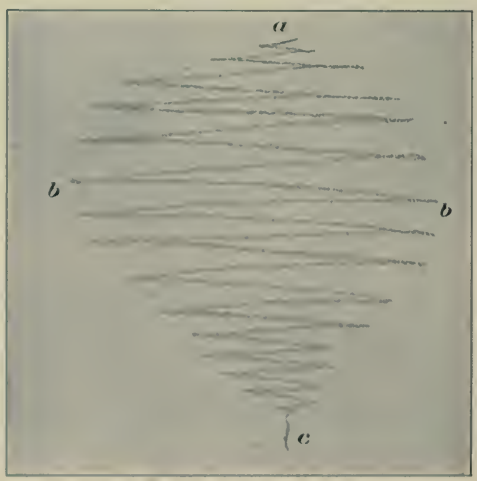

Fig. 6

or portfolio is usually more convenient. For present use, pin the drawing paper to the board and lay the latter squarely on the lap. It is not necessary to divide the paper

into any proportions for each particular exercise, as the student will be required simply to practice this work for the training of his hand and is not expected to send all of it in for criticism, unless he finds it difficult in some points and would like further suggestions.

The simple zigzag line shown in Fig. 6 should now be practiced repeatedly until the student can increase and decrease the sweeps of the pencil with a degree of uniformity that will cause the outline from *a* to *b* to *c* to assume an even graded curve. Exercises similar to those shown in Fig. 7 should not be considered satisfactory, as they are crude and uneven, but repeated practice will enable the student to conform more to what is required and train his hand to go no farther than is necessary. Fig. 6 is formed by carrying the pencil with an even rocking motion from right to left, the hand swinging on the wrist as a hinge.

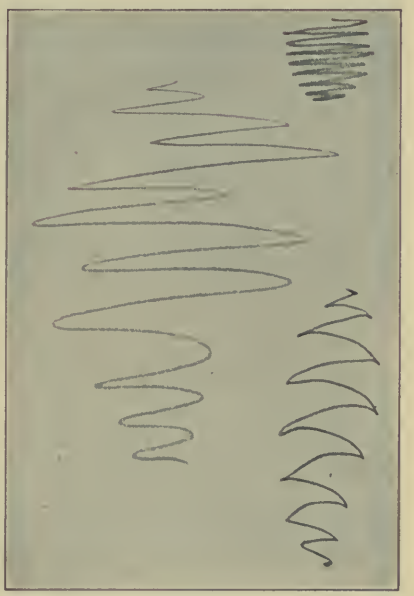

FIG. 7

After practicing this exercise repeatedly the student may pass to that shown in Fig. 8, where, it will be observed, the motion is similar but the general direction and the resulting form of the surface covered is altered. As the pencil descends in these zigzag curves it emphasizes the angles, as shown at *a*.

Simple as these two exercises may appear, too much attention cannot be given to them by the novice, as on their free and successful execution depends much of the broadness of his future work.

8. In Fig. 9, the direction of the stroke is different from that in the previous figures; the hand is turned to rest on its outer side, while the elbow must be thrown farther from the body. The fingers grasp the pencil much in the same manner as before, but it is held obliquely toward the left. With the hand in this position the student should practice a number of such exercises as *a*, Fig. 9, after which the effect may be complicated by combining a series of these exercises in order to cover the surface more thoroughly, as shown at *b*. At *c* is shown a method of covering the surface with an even tint, which may be graded in depth by varying the amount of space between the lines and by changing the weight of the lines themselves, as shown at *d* and *e*. This gradation of shade does not form a part of the student's present exercises, but it is important that he should

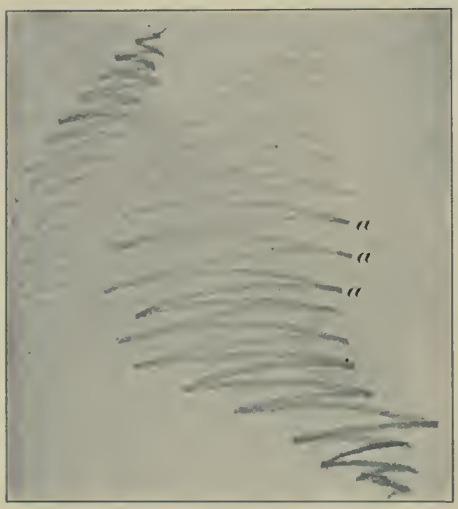

Fig. 8

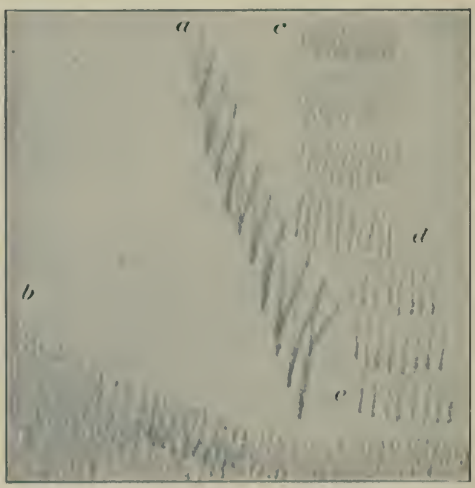

Fig. 9

keep all attempts at surface shading within the bounds of an even tint, as it is a simple matter to grade a tint when one knows how to express one smoothly and evenly. These exercises should now be repeated, but with the strokes in a

FIG. 10

horizontal position, as shown in Fig. 10; to do this it will be necessary to change the position of the pencil and to draw the elbow nearer the body, in order that the horizontal lines may be more readily executed.

9. In Fig. 11, the exercise becomes more complicated than any of the previous suggestions and leads into the first stages of the style of rendering used for foliage. Familiarity with this method enables the student to devote all his attention to the rendering of the object itself when the time comes, and he is therefore not handicapped by the consideration of two problems—what he is to render and how he is to render it. Close attention should be given to this, as the rendering of foliage is one of the most intricate problems of outdoor study, but it is at the same time the most interesting, and therefore the method of its handling is of importance.

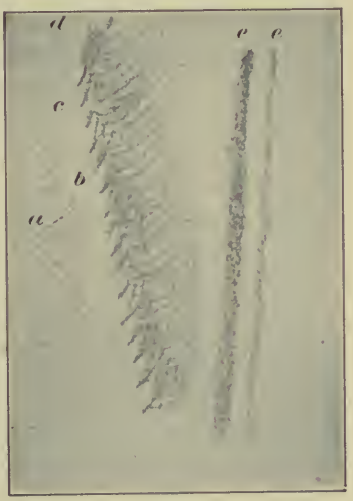

FIG. 11

To practice Fig. 11, the pencil should be held in much the same manner as in Fig. 9, but can be varied somewhat in order to render the various inclinations of the lines more readily. The series of oblique lines at *a* are drawn from left to right slowly and evenly, the hand gradually descending as each stroke is completed, while the lines shown at *b* are drawn from right to left in the same manner until they intersect with the first lines as shown. At *c* a series of short, curved lines is drawn in the same way and should be practiced from both right to left and from left to right, as circumstances are likely to arise where both methods of execution will be desirable. Having continued this practice until the student is familiar with it, he should pass to the surface shading shown at *d* where a combination of the rendering shown in Fig. 9 and that of *a*, *b*, and *c*, Fig. 11, is effected. The rendering shown at *e* is effected by means of the chisel-edged pencil, but care must be taken in drawing it not to make the lines in one long stroke, as there is a tendency for the graphite of the pencil to become polished and the line to vary in tint throughout its length.

Constant practice on these simple exercises cannot be urged too strongly, as familiarity with their power of expression must be learned before the student can attempt to go ahead with other and important work.

IMPORTANCE OF GRADATION

LIGHT AND SHADE

10. The study of **light and shade** in masses and in detail forms the groundwork of all outdoor drawing from nature. The tendency of the beginner is to try to indicate his forms by sharp outlines; this tendency should be avoided, as it is difficult to correct this fault when once formed and its practice destroys the breadth and freedom in the drawing. As a matter of fact, there is no such thing as an outline in nature; all effects are produced by light and shade. A leaf held before the eye seems to have a sharp outline, but this

outline is caused by the difference of shade between the leaf and its background; when being drawn, the form of the leaf, or any other object, should be expressed simply by a proper rendering of the light-and-shade values. These must be carefully studied and properly adjusted; the outlines of the forms will then take care of themselves. There is a positive reason for every bit of shadow, and a corresponding reason for every strong light. The latter can be much more readily understood by the student, but the gradations of shadow are likely to be overlooked, for they are so subtle that it is difficult to render them properly; yet when the drawing of an object does not conform with the appearance of the object itself, it will usually be found that the trouble lies in the rendering of the light-and-shade values of that object.

It is better for the beginner to start a new drawing, with his poor drawing before him as a guide of what to avoid, rather than to rub out any portion and try to improve it. Mistakes of this character if immediately corrected in a new drawing will do more to train the eye than repeated changes of a poor drawing. He should study carefully first for the deepest shadows and then for the highest lights. The half tones, or middle tints, are more difficult to discern, but careful study will bring them out, and when once seen can be fearlessly represented. When the high lights, the deep shadows, and middle tones have been represented, there is little more to be done than to grade them into one another and to emphasize certain details that are to be made important. This emphasis is effected by deepening certain shadows or strengthening certain lights, as shown in Fig. 12, where the deep shadow is effected by heavy penciling at *a* and the high lights are emphasized by chalk or Chinese white at *b*.

11. First Subject.—For the first attempt at outdoor sketching, a very simple subject, such as a rock with one or two weeds of simple character, should be taken. These should be expressed by first laying in, in masses, the light and shade, as shown in Fig. 13. At first the student should attempt only to represent the division of light and shade,

Fig. 12

leaving the white paper for the former and penciling in the latter. The shadow can then be emphasized by darker pencilings, where necessary, and the form of the object gradually developed by working slowly, and studying carefully the natural form from which he is working.

The rendering of the background and the shadow should be effected by means of the practice lines illustrated at *a*, *b*, *c*, Fig. 11. After the sketch has been carried about as far as is shown in Fig. 13, it should be laid aside and a second one started from the same object, carrying it farther. In the second attempt the half lights in the rock can be indicated, suggesting its uneven surface, and the leaves of the weed emphasized here and there by a light penciling to develop the more prominent characteristics. These pencilings may indicate a partially hidden stem or a shaded portion of a leaf. This shading should not be carried too far, however, as it tends to flatten or destroy the whole general effect.

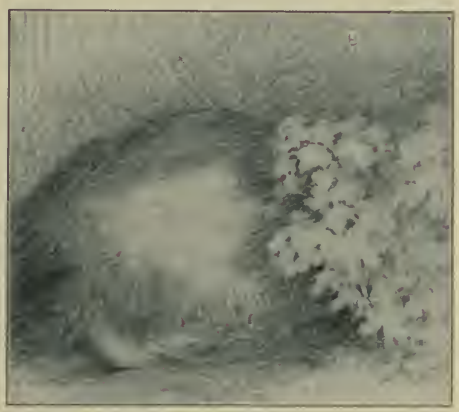

Fig. 13

These practical exercises should be drawn repeatedly by the student. They are not for the purpose of making pictures, however, but simply to train his eye and hand to observe those subtle little details that go to make up the characteristics of an entire subject. Drawings or sketches of any kind can hardly be considered pictures, but simply works of reference that may afterwards be developed into a final subject. Numerous memoranda of this kind should be made, however, for a few minutes frequently devoted to these sketches will lead to the expression of ideas in a comparatively short time.

12. Reflections.—Having studied light and shade in a general sense, attention may be given to certain reflections of light observable in the shadows of an object. These reflections are caused by the light that is thrown from surrounding objects when the sun is shining brightly. While they are an important detail in drawing, inasmuch as they furnish the key to the difference between a lifeless and a luminous, or transparent, shadow, they are at first hard to discern. This fact may be clearly understood if we consider the entrance to a cave or dark hole, which appears to us simply as a black spot devoid of detail. If the sun is shining near this opening, the depth of this shadow is likely to be strengthened, but if the sun so shines on surrounding objects that it reflects into this opening an amount of light that permits in the deepest shadow certain vague forms to be seen, the shadow becomes transparent or luminous and gives a life to the scene that it would not otherwise contain.

In strong sunlight certain objects will cast peculiarly shaped shadows; the cause of these should be carefully studied, as familiarity with the cause will facilitate the rendering of the effect. It should be borne in mind that progress can be made only by incessant observation and uninterrupted activity, and no opportunity to learn something should be neglected. Something can be learned every time one looks at an object of nature, no matter how familiar it may be to him.

The student must always be on his guard, too, against falling into habits that are prejudicial to good results. For instance, as he acquires a certain degree of skill with his pencil, he is likely to overlook a most important detail—the comparison of his rendering, as it progresses, with the object itself. At each stage of the work he should hold his drawing at arm's length, or get up and walk away, to study it in comparison with what nature is holding up to him. Frequent comparisons of this character will point out many errors, whereas a deep interest in the work and a conscious improvement in his method will have a tendency to lead to

a neglect of the model. Comparison will train the eye to follow more truthfully the subject being portrayed and will prevent the making of the too common error of trying to render from memory that which is to be rendered by direct portraiture. This method is considered so important by professional artists that it is customary for them to work standing in front of their pictures, in order that they may readily walk away and regard them from a distance instead of under the somewhat deceptive conditions of close contact. When a student makes these comparisons and finds his study is at fault, he should endeavor to discern wherein that fault lies and then correct it. The difficulty will probably lie in the rendering of his light and shade, or its comparative depth and delicacy.

13. Quality.—A picture to be of fine **quality** requires a particular appreciation of light and shade, a full expression and value of reflected lights, and a general harmony of all the parts that make it pleasing to the eye. Quality gives meaning and expression to the homeliest object. A piece of old broken board can possess quality if properly drawn; but the most beautiful tree, or combination of trees, are nothing but a lot of pencil scratches, meaningless, and without interest, when badly drawn and devoid of quality.

The true instinct of art is to make everything interesting; in order to do this as much interest must be taken in the rendering of the most commonplace object as in delineating the finest and most beautiful subject. It must never be assumed that homely things can be slurred over hurriedly in order that time may be devoted to more interesting ones. The plainest object becomes a thing of beauty when satisfactorily rendered under the artist's pencil, and much more can be learned from it than from something that is at first much more attractive. One of the most interesting details of oriental art is the care that is bestowed on all parts of the work, no matter how commonplace they may be. In rendering an object for decorative purposes, the Orientalist gives every detail its honest share of attention. For instance, a

study of a few Japanese or Chinese sketches will show the observer that the thunderbolt bursting from the heavens is of no greater importance than the butterfly flitting from flower to flower, as each is properly and emphatically rendered with the greatest care of which the artist is capable.

14. In working out of doors the student will soon observe that the shapes and positions of the shadows vary during the day. Therefore, when he intends to devote an entire day to outdoor work he must be prepared to execute two drawings—one in the morning when the sun is working from the east to the zenith, and one in the afternoon as the sun settles from the zenith to the western horizon. In the morning the shadows will be cast toward the west and in the evening toward the east. It will be found that from 9 o'clock in the morning until noon the shadows shorten very rapidly. Work on the morning study should therefore cease at least half an hour before 12 o'clock, and if the work is unfinished it should be resumed at an earlier hour some other day. If this rule is not followed, there is apt to be a false appearance in the shadows, which will give a wrong impression as to the character of the picture. Besides, 2 hours is sufficient time to work at any one subject without rest.

About 1 o'clock in the afternoon work can be resumed. A study of some other object or view should be begun and the general masses of its shadows located at the time of day that they are most interesting; if the student waits until late in the day the shadows will lengthen and the study become less interesting than in the beginning.

In Fig. 14 is shown an afternoon study where, by the shadows, it will be seen that the sun was in front of and to the right of the artist. Little detail is therefore seen in the trees, as the masses of leaves profile themselves against the lighter distant background. As the sun sinks lower and lower, after 4 o'clock, these profiled masses will become more prominent and the picture will soon lose all of its most distinguishing characteristics.

Fig. 14

The student absorbed in his work, neglectful of time, will possibly not notice the setting of the sun until there is a sudden, brilliant illumination over the entire landscape that arrests his attention, and he looks up to discover that the sun is about to drop below the horizon. This brilliancy lasts for a few moments only and is characteristic of the few minutes immediately preceding sunset. The sun then drops out of sight and a cool grayness settles over the entire view so lately glowing in brilliant light. The subjects of his study have now become dull and meaningless, and the rapid gathering twilight will gradually merge one mass into another until the outlines are entirely lost in darkness. To the artistic spirit these few minutes preceding sunset are the grandest of the day, but so subtle is the illumination and so brief is the time during which it exists that but few successfully achieve its rendering on paper.

DETAILS OF A PICTURE

FOREGROUND AND DISTANCE

FOREGROUND

15. Every picture that represents an outdoor scene can be divided into two general details—its *foreground* and its *distance*—each of which should be so handled as to emphasize or give proper value to the other. It should be borne in mind that the eye is not capable of focusing itself and receiving a distinct image of both foreground and distance at the same time. When we look at a distant object the eye adjusts itself to that distance and we see a clear image, but if there is something much nearer to us in our field of view there is a blurred and indistinct impression of this nearer object impressed within the eye. On the other hand, if the attention be directed to an object that is near to us, the eye adjusts itself to the shorter distance, and the background or details beyond the object become blurred and indistinct.

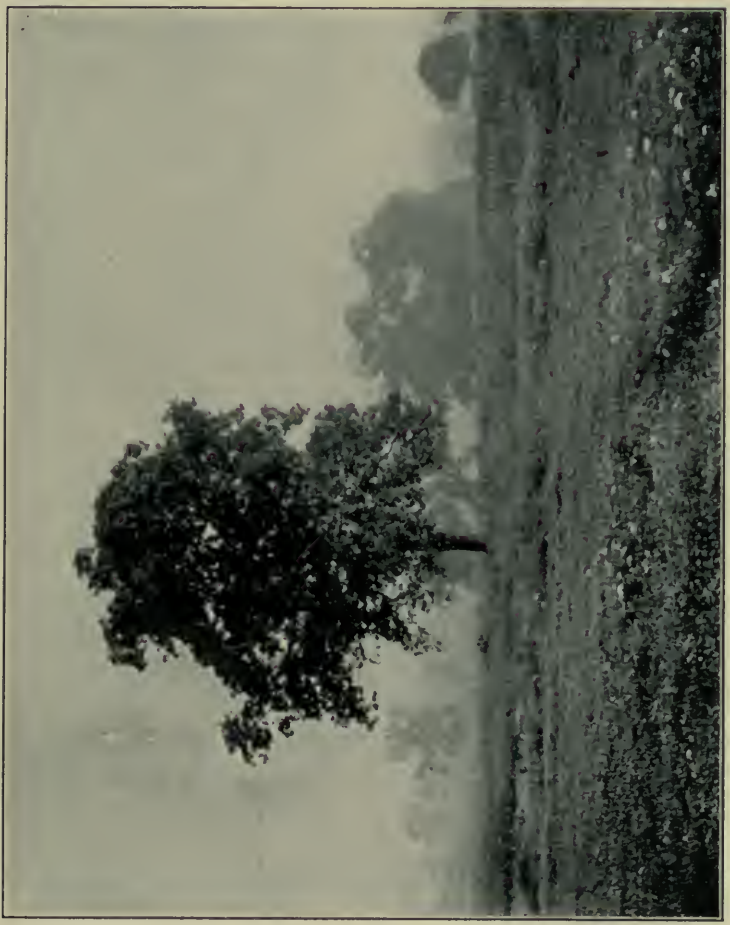

FIG. 15

This is a difficult thing for the student to realize, because in experimenting he unconsciously turns his eye away from one object to another, and the eye immediately adjusting itself gives a distinct image of each. However, whether the student can demonstrate this fact to his own satisfaction or not, he must accept this truth and render his drawings with foreground and distance accordingly.

In Fig. 15 is shown a view, with hazy masses of foliage in the distance. The objects in the foreground therefore are distinct and expressed in detail, giving depth to the picture and a fine effect of distance. In Fig. 16, however, the distance is rendered in detail and the foreground appears as a hazy, indistinct impression. These illustrations express very clearly the difference in these essentials. If in them the distance and the foreground were worked up with equal care the study would become flat and uninteresting, as the eye would wander from one detail to another without any feeling of repose as to what was intended for prominence. The eye thus wanders, because it is not accustomed to seeing foreground and distance at the same time distinctly expressed, and the feeling of depth in the picture thus becomes lost.

Generally speaking, the term **foreground** covers that portion of the landscape that lies directly in front of and nearest to the observer, and as a usual thing the details of the foreground are clearly expressed with all of their variations of light and shade. Some scenes may possess no foreground at all, but the introduction of some object near the observer immediately throws depth into the picture and gives a better idea of perspective.

16. The first bits of work that a student is likely to practice on may be considered as foreground studies, as he will work at first with the details, before he masses them to make a finished picture. In Fig. 17 is shown an old stone wall built up of ragged bits of rock and grown over with vines and flowers that give it in all its simplicity a delightfully picturesque appearance. Immediately behind the wall is a thick growth of shrubbery. This subject in all of its

FIG. 16

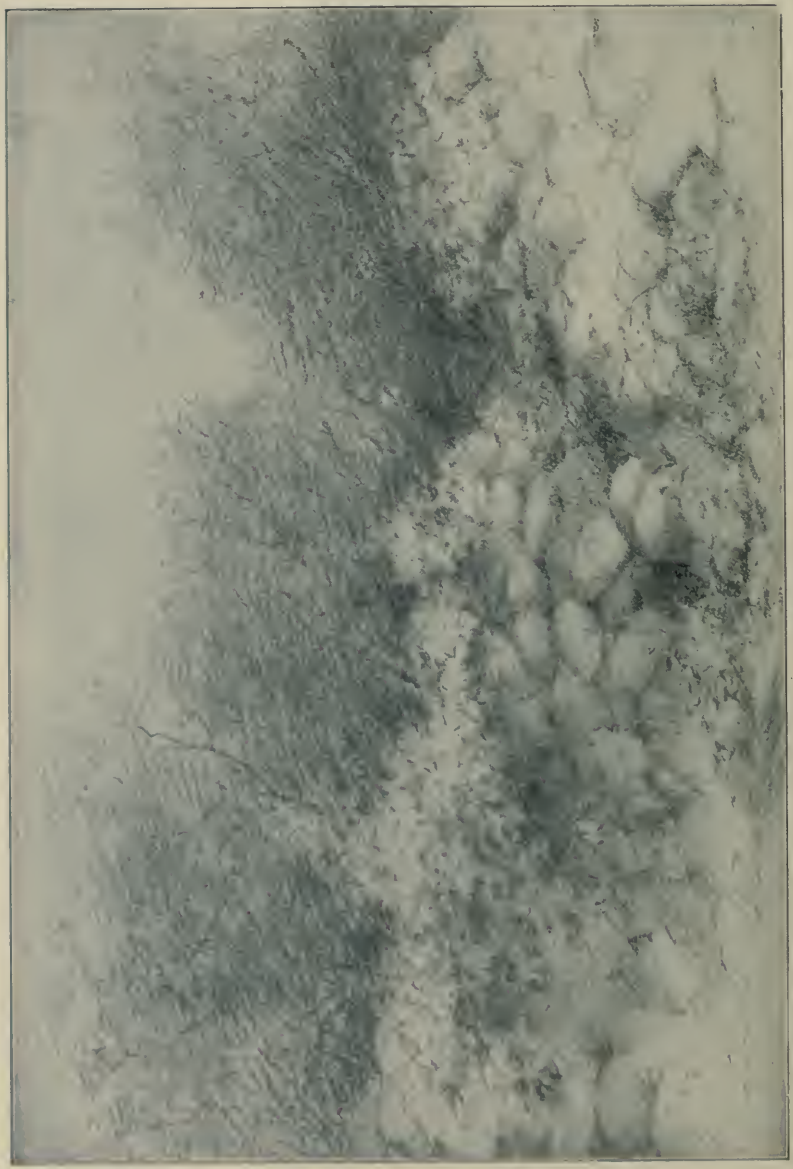

FIG. 17

details can be considered simply as a piece of foreground; there is no demand for distance, which therefore is not expressed.

A study of this kind means more than the mere objects themselves. From a utilitarian point of view, a finely built stone wall free from moisture-collecting vegetation and kept continuously in good repair is far more desirable than that shown in Fig. 17, but there is nothing artistic about it because it tells no story of interest. There is nothing in the crude straight lines of the utilitarian enclosure that appeals to one and reminds him of nature's handiwork; but with the old cobblestone wall shown, although built simply to act as an enclosure for a field, matters are different. We find nature touching it here and there with growths of moss and lichen and covering the cruder parts of it with flowering vines; the broken top, with the stones torn down, show where some truant or sportsman has crossed the country pursued or in pursuit; and these ideas convey to the mind a suggestion of something more than the object itself. Details of this character are of vast importance, as they serve for illustrations of subjects.

Illustrations are put in a book to help tell the story; the illustrator must be able to conjure before his mind an idea that illustrates a certain passage in the story, which idea must then be transformed into a visible picture so that it can be communicated to the reader. The artist therefore goes about with his eyes open, and every detail—regular or irregular—that confronts him by the roadside tells a story and conjures before his mind a picture that that detail may form a part of.

If we approach the wall closer and study in detail the plants and vines that are growing about it, we find a blossoming weed, as shown in Fig. 18. Were it growing on the field side of a wall, it is possible that the farmer would have torn it up and thrown it away as something useless, but to the artist it is something more, for a sketch of it may be useful in a number of places. This detail simply adds one more subject that may be worked into the foreground.

Fig. 18

If the entire study is foreground only, as in Fig. 18, then the details of the plants are not of such importance, as the desire is only to express the whole mass; but occasion may arise where a broad, open space with a hazy distance requires a sharp, emphatic, and characteristic outline of some familiar plant in the foreground; therefore, a closer study should be given the weeds.

DISTANCE

17. As a usual thing, **distance** in a picture may be considered as an effect more than a reality. That is to say, objects at a remote distance from the eye remind us of their existence simply by suggestion rather than by definition of form. Probably the most characteristic detail of all effects of distance is what is called the **sky line**, or that more or less irregular line where the landscape profiles itself against the sky. In marine views, the sky line consists usually of a straight line called the *horizon;* in landscapes, however, buildings, trees, or mountains usually break it into an irregular contour.

In distance we have no details to consider. The mountains may be covered with trees, or their sides may be cultivated and divided by long fences, or even in some cases peopled with small villages; but as objects of distance, these details merge together and simply produce an effect on the mountain side and do not stand out with any prominence. Clouds cast their shadows on distant hills and to a certain extent modify the effect and coloring that would otherwise exist; so that in the study of distant landscape it should be borne in mind at all times that one should simply study for the effect, and should not try to represent on paper more than can be seen. A large stone or rock in the foreground will cast a deep shadow and possess a number of gray tints in its surface, as shown in Fig. 13, but place it far in the distance and it simply becomes a bright spot on the hillside. Its color as it lies in the foreground may be of a brownish or yellowish hue, or it may be one of many stones that vary somewhat from one another in general color; but as it is

carried to the distance it gradually assumes a grayish tone until it merges, with all other objects, into one general effect and loses entirely its individuality of form and color.

The effect of distance can be produced in pencil drawing only by due consideration of thus softening the suggestive shadows of given forms. It is as though a gauze screen were stretched over the scene and the identity of certain objects becomes merged with others. This effect of softness, called in extreme cases *haze*, is sometimes referred to in pictures as **atmosphere**; it cannot well be expressed in pencil, but when properly studied can be rendered with brush in color or in a monotint.

It should be borne in mind that the shadow of an object is usually of more importance than the object itself, and that this is particularly true in distance rendering, for the object can be ignored entirely if its shadow is properly indicated. Late in the summer and early autumn the atmosphere, or haze, becomes very prominent; and, as the lengthening of the shadows is suggestive of sunset, so this heavy haze in the distance, combined with bright-colored leaves in the foreground, is the chief characteristic that makes up studies representative of autumn.

MIDDLE DISTANCE

18. For convenience of expression the space midway between the foreground and the distance is termed **middle distance**; it possesses characteristics that can be considered midway between the foreground and the distance. Objects in middle distance should be expressed in the picture midway in detail between those in the distance and those in the foreground, except in such cases where the objects in the middle distance are the points of central interest. Fig. 19 is a combination of these three divisions—foreground at *a*, middle distance at *b*, and distance at *c*. If the middle distance is to be the interesting part of the picture it should be rendered somewhat in detail. The foreground, then, being broadly expressed simply to give emphasis and

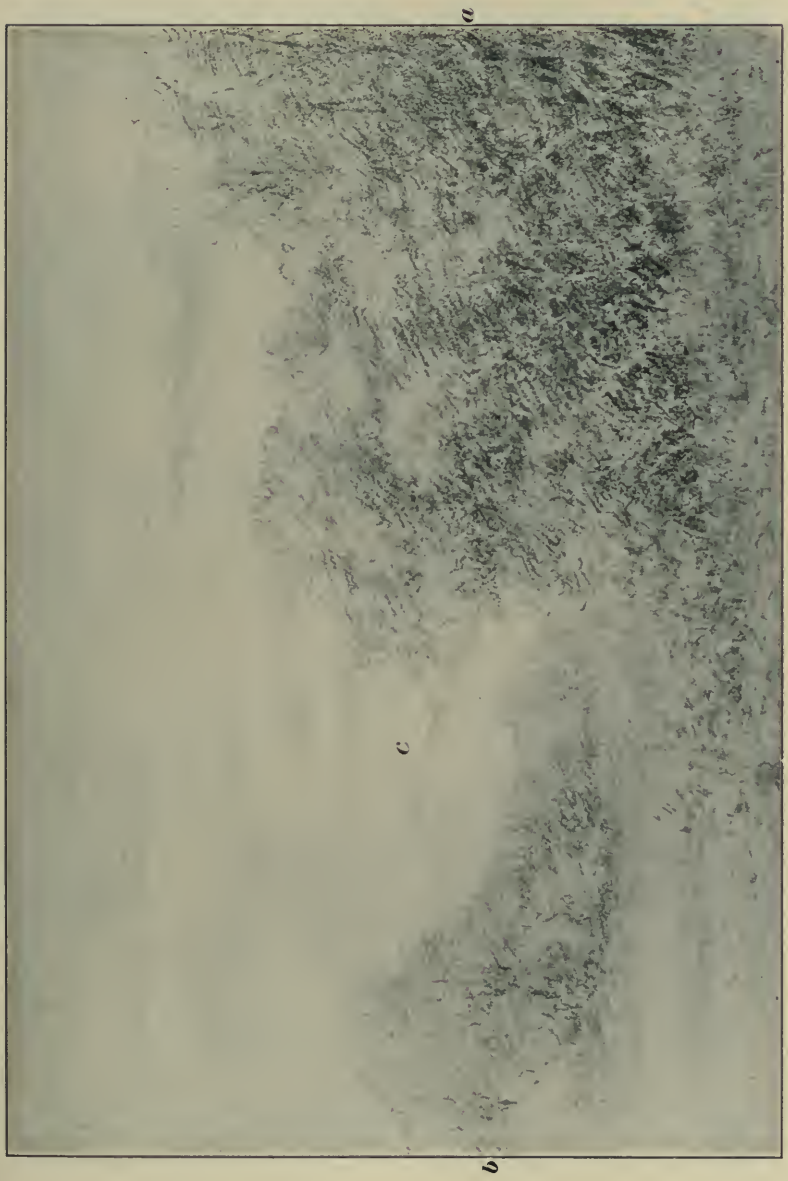

Fig. 19

effect to the distance, the distance itself need be but a mere outline introduced to emphasize the importance of the middle distance. The balancing of these details constitutes one of the most important branches in artistic work; it is called *composition*.

Middle distance, as a general rule, does not possess the same interest in the picture as either the foreground or the distance. It is sometimes introduced simply to emphasize the distance and give character to the foreground. At other times, when the beauty of the picture lies in the distant objects, the middle distance helps to soften and grade the rendering from the sharp shadows of the foreground to the soft, hazy blendings in the distant hills. The middle distance should be kept down, as a rule, and not allowed to assert itself prominently to the detriment of other parts, unless it is to be the most important and interesting part of the picture.

EXPRESSION OF FOLIAGE

TREES

19. As an accessory to landscape work the value of trees and the characteristic rendering of their foliage is of the utmost importance. In fact, drawing from nature is dependent for its expression more on trees and foliage than on any other details. Rarity of species or other botanical consideration has nothing whatever to do with the value of foliage from a pictorial point of view, as the commonest shrub properly introduced into a picture will lend quite as much to its interest as the representation of the rarest exotic plant.

Suggestions have been given on the general rendering of foliage, but in the application of this rendering to tree forms, especial attention must be given to the rendering of those forms in such a manner that the characteristics of the tree will be represented. When one observes a tree and recognizes it as a birch, maple, elm, or apple tree, he determines the fact not by the general outline, nor by the form of its leaf,

nor by the form or marking of its trunk, but by the general expression of all three. The manner of its growth, the clustering of its leaves on its branches, and the distribution of the branches about its trunk produce certain effects of light and shade that characterize the general appearance of each individual tree.

The student should study trees as a part of nature, not minutely scrutinizing every detail but by slightly closing his eyes as he looks at them, so that the details do not appear with distinctness but impress themselves on him as small masses of light and shade. The rendering of these masses will then present to him a drawing of the characteristics of that particular kind of tree. Trees possess as much individuality and character as do persons or animals, and will appear different under different conditions, but at the same time they will preserve the characteristic that stamps their identity. Observe the effects on some trees both of a light breeze and of strong sunlight. Some kinds of ash become brilliant with flickering dots of light as a light breeze twists their leaves and turns the silvery underside toward the sun. Some trees and foliage, like the scrub oak and other dense growths, present in the brilliant sunlight simply strong masses of light and shade, and on a dark or cloudy day a silhouette mass against the background.

20. Branches always carry out the characteristics that dominate the formation of the trunk. Their growth and general movement always follow lightly the construction and character of the parent stem. If the trunk is rugged, angular, or grotesque, the branches display these same qualities. They may twist into snakelike forms or break suddenly into angular elbows, as shown in Fig. 20 (*a*), or may turn their leaves lightly to the breeze with a frivolity suggestive of a full enjoyment of sunshine and brightness, as shown in Fig. 20 (*b*), or they may lift their tapering ends toward the sky apparently tranquil and unmoved by the violent gusts that set their neighbors quivering, as shown at (*c*). These expressions should always be studied as characteristic

of certain trees. In Fig. 20, (*a*) is suggestive of the growth of the oak and the apple tree, (*b*) of the birch and the elm,

Fig. 20

(*c*) of the poplar, etc. Not that these three forms are characteristic of these trees themselves, but the manner of their growth, the expression of patience and endurance, of

frivolity or of stolidity, according as each individual tree impresses itself on the mind.

As said before, the student must learn to see before he can learn to draw, and he is therefore advised to study constantly the effects and appearances of different classes of foliage before any attempt is made to render them according to the suggestions made in the following pages. Studies should then be made of tree trunks and roots (where the latter appear above ground), of small portions of branches (in the fall) on leafless trees, and of branches and leaves (in the early spring) before the density of foliage hides the characteristics of the growth.

21. Notwithstanding the fact that every tree has a characteristic foliated outline of its own, a general system of

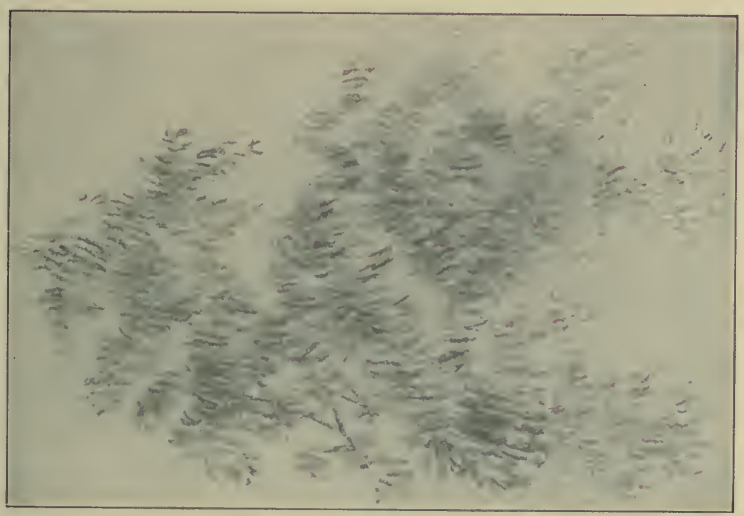

FIG. 21

rendering these outlines will be found perfectly practical in nearly all lines of work. The difficulty first experienced by the beginner is the representation of the foliated mass, owing to the multiplicity of leaves at which he is inclined to look too closely and see details instead of masses. Here

"the innocence of the eye" is the characteristic that enables him to represent things as they appear and not as he knows them to be. Here is the time to close the eyes partially and observe the effects of light and shade in various masses entirely distinct from any leaf or branch formation, as shown in Fig. 21. These masses, whether profiled against the sky or against a background of a lighter or darker hue, will be outlined definitely but by an irregular contour, and a little study will convince the student that this contour consists of a number of toothed forms or serrated lines not greatly unlike a series of figures 3, as indicated in Fig. 22. This figure-3 formation should not be followed too closely, but its application will be found of importance in nearly every

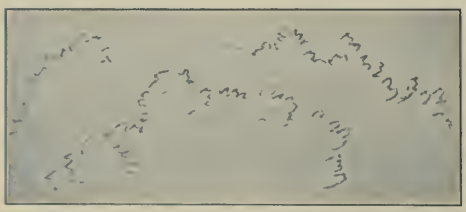

FIG. 22

FIG. 23

foliated outline, and the emphasis of one portion of this outline more than some other portion will tend to give the character that will stamp a particular class of foliage.

The outline of foliage thus rendered will contain some

figures 3 that are sharp and angular, others that are rounded, and still others that run together and form a continuous zig-zag, irregular line, as shown in Fig. 23. They can thus be varied at will, where circumstances require it, and the student has in this simple device the means with which to start nearly all of his foliated outlines; although there are other devices more serviceable for expressing some specific class of foliage, those referred to will establish a near approach to general leafy outlines. This, however, refers only to the outer formation of a mass of foliage. These devices should never be carried in to the inner mass, which should always be handled as a mass of light and shade and rendered very differently.

22. Drawing Masses of Foliage.—In Fig. 24 it will be observed that the mass of the foliage is made up of

FIG. 24

broad strokes, drawn largely with the wedge-shaped point of the pencil, through which the trunk and branches are indicated rather than clearly expressed. These flat strokes form an even tone, varying in intensity according to the denseness or lightness of the foliage rendered. The lines merge into each other and form a deep shadow where the leaves are so thick that light cannot penetrate, thus giving

a sense of compactness without introducing any detail. This shadow form can be carried out on the dark side of the tree or foliage until it merges into the irregular outline, but it must not meet the leaf outline of the light side of the tree or it will destroy the feeling of sunlight penetrating between the irregular leaves.

Generally speaking, the darkest shadow in foliage is near the ground where the lower and more heavily laden branches hang over the trunk at a downward angle. Foliage always appears darker underneath the outside limbs and nearest the trunk of the tree, and softens in tint as it approaches the top for the reason that the light has a better chance to sift through the branches. In making drawings of foliage the subject should always be studied with partially closed eyes, so as to reduce the intense glare of sunlight, in order that the subject may be seen as a mass instead of as a myriad of details.

It is practically impossible, as well as unnecessary, to detail here the characteristics of every species and kind of tree. The student, however, should study foliage in general, and after becoming able to render three or four different kinds of foliage he will find that he has become observant of their general characteristics and is quite as able to render some other kind omitted in the descriptions in the following pages.

23. The oak is probably one of the most common as well as the most popular of American trees. Its broad-spreading branches and thickly tufted top stamps it with a character of strength and individuality that has caused it to be termed "the king of the forest" by various writers. The trunk of an old oak is usually rough and gnarled, telling a story of storms that it has withstood and of winds that have warped and twisted its branches.

The trunk and branches in Fig. 25 are characteristic of this class of growth, while the broken branch on the left side of the tree at *a* is characteristic of this tree inasmuch as the lower branches are so frequently wrenched from the trunk

by the high winds. Small details of this character are of vast importance to the art student, simple though they may be, for on them depends in many cases the individuality of the growth.

The bark on the oak expresses itself as a series of perpendicular grooves and should be rendered by irregular, disjointed lines, not uniform in distribution or weight, but rather crudely executed with a tendency to intermingle and become a shadowy mass on the dark side of the tree, while the light side is left clear to be outlined by its profile against a dark foliated background, as shown in Fig. 26. On the dark shadow side, however, the various markings must be emphasized in some places to prevent flatness and lack of character. These emphatic markings will be seen in nature to be indentations more deeply expressed in the bark, than some others.

Fig. 25

The tendency of the beginner is to introduce too much detail of this character; he should, therefore, carefully study his subject and his drawing, and omit the introduction of any emphasizing details after the drawing expresses itself clearly. The pencil rendering should follow the main lines of the grain of the bark.

FIG. 26

The old trunk in Fig. 26 has been bent beyond the line of its natural balance from constant exposure to winds generally

FIG. 27

prevailing in one direction. The exposed roots on the left side show that heavier winds during the maturity of the tree raised it from the soil from whence it sprung. These exposed

roots, it will be observed, are usually bleached to an ashy whiteness; they are not covered with bark, for nature intended

Fig. 28

them to be underground to absorb sap for the nourishment of the leaves, and when torn from their natural element they have either died or have become simply a series of

connecting tubes with the working roots in the ground and the sap cells in the trunk.

In Fig. 27 the oak is rendered with its foliage expressed in peculiar rambling lines; through the shadows, which deepen in masses as the foliage approaches the trunk, are indicated rather than clearly expressed the gnarly, irregular forms of the twisted branches. The outlines of the foliage here express the application of the figures 3, as shown in Fig. 22. After this general outline has been sketched, the masses of the foliage should be rendered by short pencil strokes until they are expressed, as shown in Fig. 28.

24. The **apple tree** possesses somewhat the same characteristics as the oak, but the similarity exists more in the trunk and limbs than in the general foliage. The same system of treatment can be used for both species, but the handling of the foliage should follow more closely the suggestions illustrated in Figs. 21 and 24. In Fig. 29 the crooked, twisted boughs are left more exposed than they ordinarily appear in the natural tree, so as to give a better idea of this irregular formation. Apple trees have characteristically short, thick trunks. They seldom grow straight out of the ground, but lean according to climatic and other conditions. A large crop of fruit in their youth will often cause a permanent leaning in one direction; frequent prevailing winds will carry off the blossoms in early spring more from one side than another, thereby causing less fruit to ripen on the windward side and thus incline the tree in the opposite direction.

Apple trees form an interesting study for the artist on account of the dash and independence expressed in their growth. They also form, as do other fruit trees, three separate subjects for illustration. In March and April, their blossoms opening before the green leaves form a brilliant pink-and-white mass beautifully suggestive and often used as symbolic of spring. In July, August, and September, their boughs become laden with yellow and red fruit and are used symbolically as expressive of approaching fall and

FIG. 29

the harvest; and later, the leafless trees with their gnarly boughs and rugged trunks are strongly expressive of approaching winter.

25. The Elm.—In direct contrast to the rugged, homely dignity of the apple tree, we have the **elm**, whose tall, graceful form and radiating limbs are seldom sufficiently clothed with leaves to hide their symmetry and regularity. The elm tree is a tree of beauty, and it seems to exist solely to please the esthetic eye. It is always in harmony with the landscape, whether alone or in clusters, in a meadow, or leaning on the bank of some stream where its delicate lines are reflected in the water. Where elms exist about our homes or in our public parks they are usually protected, not only on account of their shade but also on account of their beauty and refined dignity.

Though so characteristic in outline that their form can never be mistaken for another variety of tree, their outlines are so varied that no two of them seem to bear the slightest resemblance to each other. Some forms present fuzzy tipped foliage somewhat like gigantic ferns, as shown in Fig. 30. The soft green extending across the boughs exposes the length of the limb beneath, on which the sunlight plays in bright patches. Though the foliage is expressed in masses of light and shade, as in other growths, the shadow is never as deep as with the oak and apple, but preserves a transparency through which all the details of growth can usually be observed. When profiled against the sky, patches of blue are observable all through the upper branches and give a lightness and transparency to the growth that is characteristic of no other tree. Other elms spread out in a fan form, as shown in Fig. 31; the lower limbs grow straight and the foliage comes out in large masses at the top, causing them to spread out umbrella-fashion, casting a deep, somber shade over their surroundings, but the general characteristics of the tree remain ever the same.

26. Drawing the Foliage of the Elm.—The foliage of the elm can best be expressed by a series of short parallel

FIG. 30

FIG. 31

lines, as shown in Fig. 32 (*a*), afterwards strengthened to form the deeper shadows, as shown in Fig. 32 (*b*). The trunk is moderately smooth and the indentations less apparent than in other trees. The lack of the appearance of strong markings on the trunk of the elm is due to two causes: first, to the absence of deep indentations in the bark; second, to the fact that as the general beauty of the tree lies almost exclusively in its general formation and foliage, the eye dwells but a short time on the trunk and does not take in all of its characteristics. In drawing, the trunk should first be rendered in outline, as shown in Fig. 33, and then slightly shaded to indicate the dark side of the tree.

FIG. 32

Care should be exercised in drawing all trees—particularly the elm—that even the largest branch is never as large as any part of the trunk, and that branches leading from larger limbs are always smaller than those limbs. There is a constantly decreased proportion as one part grows out of another and the tree thus grows lighter toward its top and extremities, while the trunk acts as the parent of the whole and in quiet dignity supports the entire system.

27. The **beech tree** is entirely different from those heretofore considered. The bark is nearly smooth and the

lines of the bark run around the trunk rather than perpendicularly, except where it has become split and forms deep fissures, as shown in Fig. 34. On the surface of the older trunks, small knobs form, but these are not characteristic of the younger trees. The foliage is quite thick but much less bulky than that of the oak, and the outlines of the foliage are indicated in an entirely different manner. The pencil strokes should be short and accented at one end, as shown in Fig. 35 (*a*), and should be nearly parallel to the lines of the short limbs from which the foliage springs. The leaves grow loosely along each twig, producing the open and dainty effect of leafage, shown in the more finished sketch, Fig. 35 (*b*), which is very pretty but rather difficult to suggest without running into complications. The boughs are limber and sway widely in the wind, thus preventing the shadows cast by them on the ground from being definite in form. In characteristic illustrations, it is necessary that the softness of the edges of the shadows cast by the limbs of the beech tree be characteristic of the sketch.

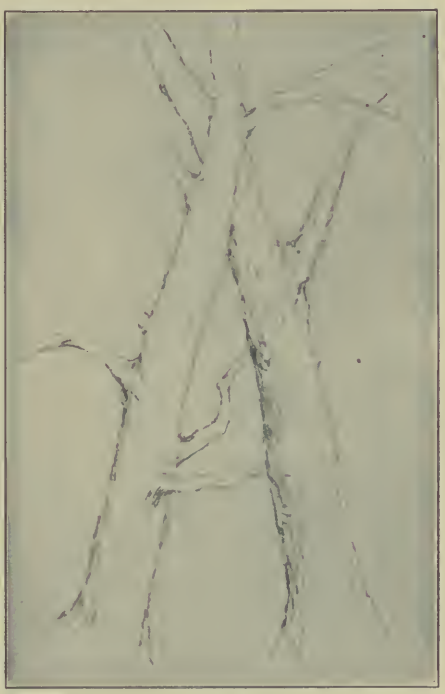

Fig. 33

28. The **willow** is a beautiful and characteristic tree almost always associated with the river bank or brook side. It is not characteristically a shade tree, for although as a rule very large and luxuriant in growth, it is so

Fig. 31

open in its foliated structure that the sun easily finds its way through the leaves and casts but a small and spotted shadow on the ground. The common willow growing along the brook side is usually so thickly foliated that scarcely any of its trunk can be seen, but the Pollard willow grows with a heavy trunk and small branches, there being characteristically few heavy branches in its entire makeup. The common willow, when separated from the marshy ground of the brook or river side, grows into a large and bulky tree, as shown in Fig. 36. The trunk is rough and deeply scored and from it branch long, slender, featherlike twigs with tapering leaves that wave gently in the breeze and give the entire tree a soft, indistinct outline characteristic of its species.

(*a*)

(*b*)

FIG. 35

29. It is in trees of this character, whose leaves are ever moving and thereby unable to make a clear impression of outline within the eye, that we are forced to use the *stomp* as an accessory in pencil drawing. The **stomp** consists of a roll of paper or chamois leather pointed at one end, with which the sharpness of outlines can be softened and the hard

contour of a drawing blended gently into the background. The stomp is sometimes used instead of the pencil, by rubbing it on crayon or charcoal scrapings until the end is

FIG. 36

black, and then applying it to the drawing paper to make soft, blended tones instead of sharp pencil marks. In pencil drawings, the stomp can be with advantage applied to the

sandpaper pad on which the pencil has been sharpened, taking therefrom some of the scraped pencil lead, which can afterwards be applied in strokes or spots in order to

FIG. 37

produce a soft, smoky effect, as illustrated in Figs. 36 and 37.

The **weeping willow,** shown in Fig. 37, so called on account of its long, trailing branches, is not so common as

the ordinary kind and therefore is not so well known. Its long, pendant, whiplike boughs are graceful and pleasing. The method of handling this subject in drawing is shown in Fig. 38 (*a*). It is similar to the rendering of the common willow, shown in Fig. 38 (*b*), except that the stomp need be used with the weeping willow only where the ends of the branches hang and it is desired to give the blurred or soft effect characteristic of movement in the wind.

(*a*)

(*b*)

FIG. 38

30. White, or silver, **birch trees** are rare in some parts of the United States, but seem to thrive in northern climates. The finer specimens grow to a large size and their silvery bark splits and peels from the trunk through the influence of the warm sun of summer and the cold winds of winter.

Fig. 39 illustrates a characteristic trunk of an old birch tree, the bark being peeled from many places. The white rendering in other parts is expressed by means of ordinary chalk. It is well, where objects of this character are drawn, to use a gray or tinted paper, as the characteristic whiteness of the bark and of the high lights on their foliage can be

FIG. 39

expressed by the application of chalk marks and thus rendered very emphatic. It will be observed that where bark is peeled off the tree, the tint is darker. This is due to the fact that under the white bark of the birch lies a second layer of a rich yellow color, and under that a layer that runs to a yellowish brown. It is well that these facts should be clearly understood, for the value of the various tones and tints represented in a pencil drawing must be made to accord with the actual colors existing in nature, and too much attention cannot be given to the impression created within the eye by the various tints of green, brown, and yellow that are everywhere abundant in drawings from nature.

The grain of birch bark runs around the trunk, so that when it is stripped from the trunk the lines of the stripping are straight and parallel, but the markings of the bark itself may be observed to run perpendicularly here and there. Where, either from natural causes or through the stripping of the bark as souvenirs, a cut has been made in it, the bark will curl out of it and away from the trunk of the tree as it dries, leaving scrolls and perpendicular lines in contrast with and giving variety to the general lines of the trunk shading. The younger trunks are often free from markings of any kind and form a dainty white column surmounted by a dome of green that is at once conspicuous and beautiful in the general landscape, as shown in Fig. 40.

31. The general foliage should be handled with downward strokes running into little masses of light at the end of the branches, as indicated in Fig. 41, while on the sunlit side the softness and delicacy of the leaves should be expressed by the omission of all shading, other than is necessary to express the general grouping on the surface. The leafage catches the light and holds it in masses, which is singular, considering its loose and free setting on the boughs. The limbs are uniform and lack any characteristic eccentricity that might be expected of a tree so subjected to climatic influences.

Fig. 40

In studying this tree, all these details should be borne in mind and emphasized in the drawing so that they may not be omitted where the illustration of the birch tree forms a detail of a subject. The black and yellow birches are much more common than the white. They have the same general markings on the bark, while the branches and foliage are much the same. The bark, however, is of a darker color, and these trees do not possess the same attractiveness to the artist as do the silver birches.

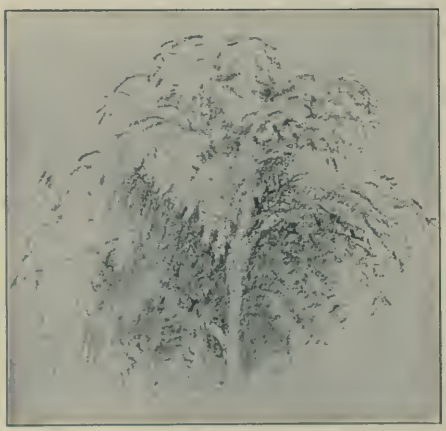

FIG. 41

The trunks of young birches may be best expressed by showing as much white paper as possible, as in Fig. 42, indicating the markings of the bark here and there and emphasizing certain parts where the bark is peeled off. If in this emphasis a curled bark is shown, so much the better, although this is not necessary except where the drawing requires an absolute portrait of the birch itself.

32. Pine trees and other **evergreens** include a large family whose chief characteristic is the property of remaining green all the year round. None of them have a regular leaf, so characteristic of other trees, but at the end of their branches grow a series of needlelike spurs that give a stiff regularity to their outline, which is characteristic of the species.

The tall pine illustrated in Fig. 43 is characteristic in its general appearance of the spruce, fir, juniper, balsam, larch, etc., any one of which forms a conspicuous figure in a sunny landscape by its dark-green outline being sharply profiled against the background. Pines, however, are usually banded

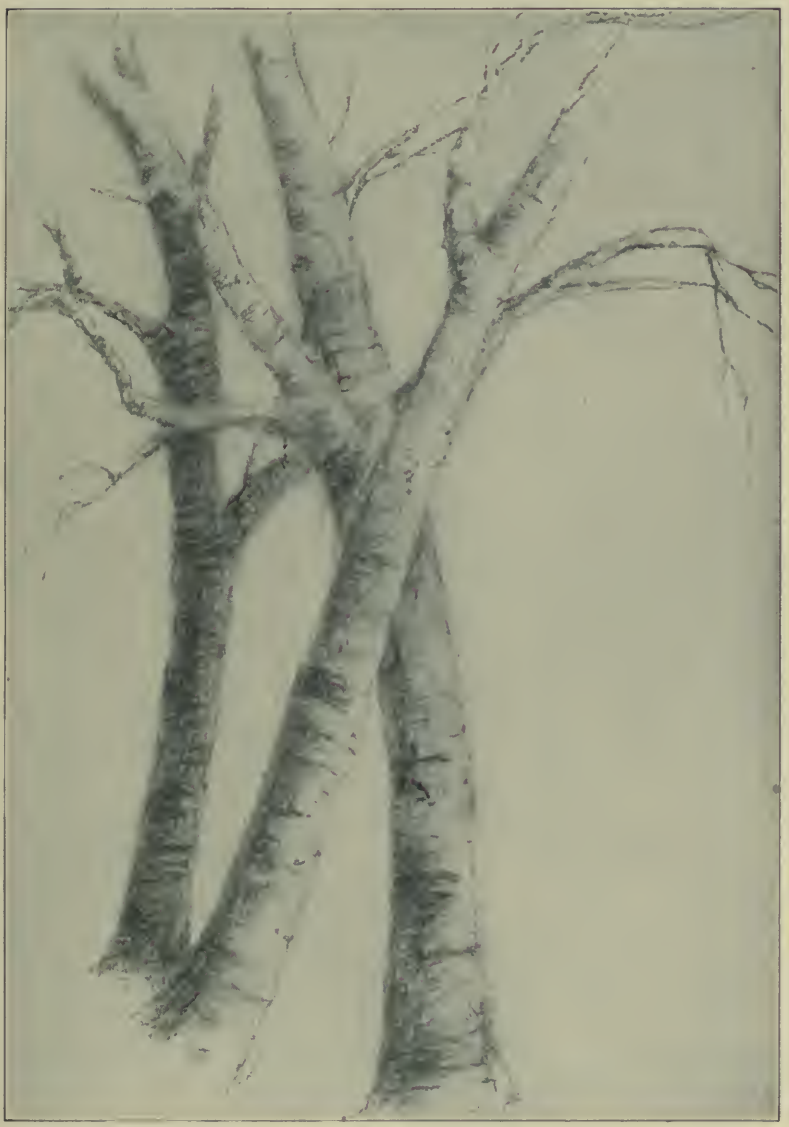

FIG. 42

Fig. 43

together in groups and are found more abundantly in northern, or cold, climates. The pine tree, too, must be considered carefully in connection with the general landscape, as it is a simple matter to place it amid surroundings entirely incongruous. A pine is seldom seen alone in the middle of a grassy meadow, by the side of a bubbling brook, or in low, sandy soil. On a rocky hillside, in the dense forest overhanging a running stream, or with numerous others forming a grove, it is characteristic and appropriate.

When seen alone, as in Fig. 43, the trunk of the pine can be traced very clearly throughout its entire length. The branches radiate from the trunk almost horizontally and seldom break into small growths; from the sides and ends of the branches, short, straight twigs spring, bearing the long pine needles heretofore described. The trunk is rough, yet not deeply scored and is seldom very large in comparison with the height. The limbs at the top usually slant toward the sky and are short and thinly foliated, but toward the bottom the limbs become more and more horizontal until the lower ones droop toward the earth, owing to their great length. There is very little of the trunk above ground to the point where the branches commence, and the lower branches are often seen trailing on the ground.

FIG. 44

The stiff little spiky foliage is best represented by a sketchy stroke of the pencil, as shown in Fig. 44, which may be shaded underneath by the introduction of a little

stomp work. The outline touches, however, must be very irregular, in order to prevent a stiff fuzziness that is more characteristic of foliage forms than of pine needles.

GRASS

33. Ordinary **field grass** may be seen everywhere in abundance, but a word or two as to its handling is necessary in order that the student may get the proper idea. All that is required in rendering grass with the pencil is a certain deftness of touch. It is soon learned, when the hand has accomplished the foregoing exercises. The stroke is not unlike foliated shading and may be seen by referring to *a*, Fig. 45, where the short, sketchy lines indicate a growth

FIG. 45

of grass; the lines shown at *b*, Fig. 45, are suggestive of the taller forms of grass, the latter being indicated usually by the wedge-shaped pencil. In doing this, the pencil should be placed at the root of the grass and the stroke drawn in the direction of the blade, curling slightly in the direction the wind blows. The paper should be left blank in places near the roots, as this suggests falling of sunlight in small patches and gives a softness to the whole not otherwise obtainable. Some blades should be drawn more heavily than others and these should be always darker at the bottom.

ACCESSORIES TO LANDSCAPES

34. Logs and Rocks.—In order to give depth to landscapes, it is sometimes necessary to represent a log or a trunk of an old tree in the foreground. This being near the eye, attracts the attention and gives the viewer an opportunity to judge the proportions of the rest of the picture, as a log or other commonplace subject gives a fairly definite idea to the mind of the average individual. Having established this idea mentally, the viewer can judge the relative proportions of the rest of the picture.

FIG. 46

In drawing the log it is not necessary nor desirable that it should be characteristic of any class of tree. A log is a log, when it comes to landscape work, and one never stops to analyze whether it is the log of an oak tree, a chestnut tree, or an apple tree. The rendering of its bark can therefore be somewhat of a conventional character, as shown in Fig. 46, but the markings of its end or cross-section should be sharply indicated, to show that it is an old log and has been subjected to the wrecking influences of the weather.

Stones and rocks serve a similar purpose, particularly where water is introduced in the foreground, Fig. 47; these details serve to give prominence to the near part of the

FIG. 47

picture, add depth to the study, and create a feeling of distance.

With this study of distance comes the necessity of a

FIG. 48

knowledge of the gradations in tints in order to express the position of certain objects relative to one another, as shown in Fig. 48, where the foliage is entirely the same in character from one end of the illustration to the other, but the left end is made to recede by lightening the touch and at the same time decreasing the distinctness with which the forms and outlines are expressed. The eye being accustomed to seeing near things distinctly and distant objects vaguely, at once is possessed with a feeling of distance and perspective in such a drawing.

Sometimes the foreground will admit of the introduction of a fence post and tree stump, or of an old bar gate, as

Fig. 49

shown in Fig. 49, all of which can be worked up to any degree necessary in order to arrest the eye in the foreground. The distance should then be carefully carried out in a hazy sort of way in order that it may give depth to the picture and not encroach too closely upon the object that is illustrated.

Generally speaking, the rendering of all classes of foliage is the same whether it be in the foreground or in the distance, but there are certain characteristics of each class that must be emphasized when the tree or shrubbery is in the

foreground, if it is desired that the character of that tree is to be expressed in the picture.

Sharp outline and minute detail is to be avoided in all illustrative work. Masses of light and shade alone should be used to create the outline of an object, as well as its distance, the relative value of the light and shade masses being of less importance as the object recedes from the eye.

WATER

35. With the exception of marine subjects, which constitute a study by themselves, **water** as an accessory in landscape sketching is a simple subject to master. It is usually expressed by straight lines more or less accented according to its distance from the eye.

In Fig. 50 is shown a simple effect of shrubbery and stones with their reflections in the water. The handling of the shrubbery is in no way different from the examples described, while the water is represented by a series of broken horizontal lines suggestive of a quiet stream. Where the shrubbery is dense behind the stones, it is represented by deep shadows on account of the shutting off of direct light. The reflections of the stones in the water are not strongly defined, except at the point of contact between the water and the stones themselves. The general shading and distinctness of the reflections lose in definition as they recede from the eye, and the shrubbery and stones grow lighter as they extend into the sunlight. The foliage and shore in the distance are effected by a lightness and delicacy of tint, thus giving, combined with its reduced proportions, the effect of perspective. Little reflection can be seen here, and a few soft lines of shading in the water is all that is required.

36. Lines of reflection in water are variable and depend on different conditions of the atmosphere and surrounding influences. No rule as to the length of reflections or gradation of lines can be given. These must be studied as they appear in nature and cannot be illustrated by any series of drawings, as no two conditions will produce similar

results; but, like the general handling for foliage, the simple delineation of water effects by means of horizontal lines can be varied to suit the majority of cases. As they approach the eye, the lines become more broken and show broader spaces between; the reflections of trees and objects along the banks become broken up by these lines and produce the effect of ripples as the water is roughened in the breeze.

In drawing reflected trunks and shrubbery, the lines should not be hard or continuous, but softened and blended somewhat into the general shadow. In working outdoors, the student will observe that all shadows soften with a gradually lessening force until they are lost in a mass of varied tints.

There are occasions when the water possesses a mirror-like stillness; the reflections are then as sharp and distinct as the subject itself (as shown near the bank in Fig. 50). But, as a rule, a light breeze will roughen up the water somewhat distant from the shore and leave the distinct reflections close in shore, cutting them off sharply where the ripples pass over the surface. This phase of reflections is, as a rule, not so pleasing in art work, unless it is intended to be the subject of the composition. The soft, mysterious, and subtle reflections in rippled water is far more popular and appeals more to the artistic eye. Toward sundown a charming effect may occasionally be observed, where the objects on the bank are reflected in elongated, perpendicular lines like delicate fringes, and common objects such as grass or sticks are difficult to recognize.

Reflections vary so rapidly that it is necessary to observe closely and receive impressions of their form if they are to be sketched on paper, as they do not last long in any one shape. If the impression is not securely received at first it must be abandoned for another, as a change of wind will vary the form of reflections almost indefinitely.

It should be remembered that the effects of reflection are much more prominent in shadow than in sunlight. Near the shore where the trees hang over and shade it, the water

FIG. 50

carries the combined tones of all that grows above it and often merges into an intense dark tint near the shore. This dark tint is broken by occasional bright lines, due to ripples receiving and reflecting the sunshine, but these are not so light as those in midstream.

37. A stony brook or creek makes an attractive subject for study, especially when stones are scattered along its edges and through its shallow bed. These introduce varied forms and tints and contrast well with the clear water that ripples around them. Should the banks be fringed with bushes, as they usually are, these will form the central feature of the landscape, while the stones and rippling water go to form a pleasing foreground. This is only the case, however, where the shore is in strong sunlight, for when in shadow the shore becomes a matter of distance, and the stones and rippling water themselves form the foreground and subject of the composition.

Lakes are rather more difficult to represent in pencil studies than are streams, owing to the broad, unbroken expanse of water. There is little gradation of light and shade throughout the surface, except that produced by reflected clouds, which will be considered later. Near the shores, however, the water will darken by the reflection of the foliage, but the dark surface will be broken in patches by a rippling breeze.

38. As a usual thing, the representation of water in bright sunshine should be expressed with as few lines as possible, the white drawing paper being left to produce this effect. This treatment can be made much more effective by the introduction of delicate lines leading from the light and gradually deepening as they recede into the shadow spaces near the banks. When the trees along the stream are dark the shadows below them will also be dark, but much less distinct than the original objects. When the foliage above the bank shows occasional glimpses of sky between the branches, these patches of light show also in the quiet water, but are much softened.

Shallow streams are often so clear that the pebbled bottom is perfectly distinct, but these pebbles should not be indicated in a sketch, as it would destroy the effect of the presence of the water. The representation of the shadowy depth along the bank of a stream helps to give that limpid effect so characteristic of water.

In Fig. 50 is shown a mountain brook shut in between well-wooded banks, and though deeply shaded in places, the sunlight breaks through the foliage and lights up the stones and water with patches of brilliancy. The reflections of the trees and stones break up its surface with shadows, the thick foliage on the left causing a deep shade, and the dead pines on the right acting less markedly as their lack of foliage permits the sun to shine through on the stream. In Fig. 53 there is nothing different from previous illustrations, but the details are combined here to form a picture and the illustration is somewhat more complicated, as it possesses more details, although they have been illustrated separately before.

It must be borne in mind that with the combination of two or more objects in one composition or picture, more thought is required in order that the parts may balance well. One must also learn to depend on his own knowledge and ability in rendering and compare his effects with those described as individual objects in previous studies. He must learn to depend more and more on himself and work continuously out of doors, benefiting by the criticisms he has received and applying those benefits as he progresses. He will develop his own individuality by experimenting boldly, and even though his results are not satisfactory at first he will have learned something, if it is only in some cases the avoidance of certain methods of reproduction.

SKY

39. The manipulation of the pencil to produce **sky effects** is one that introduces lines to express different kinds of clouds. A placid, quiet sky can be rendered by fine horizontal lines made with a light, delicate touch, as

shown in Fig. 51. Character can be imparted to clouds by curving the lines somewhat, as shown in Fig. 52; this can be varied to any degree, representing the large, soft, fleecy

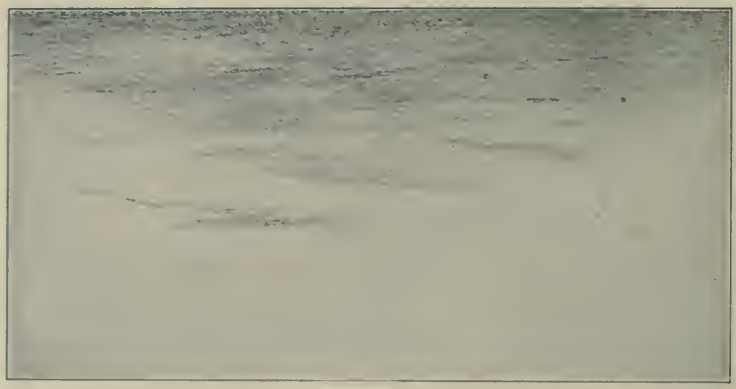

Fig. 51

clouds characteristic of a bright summer day or the heavy thunder clouds lying close to the horizon. The selection of a suitable sky with the landscape is a matter of great importance, and when a lowering sky is in keeping with the picture,

Fig. 52

the gray tones of the clouds can be made more somber with few strong lights, unless in some one spot.

In Fig. 53 is shown the border of a lake with a cloudy sky

characteristic of a stormy day. The foliage of the trees is so rendered as to give the feeling of fog or fine rain, an

FIG. 53

effect that is best rendered by means of the stomp. Wind-swept clouds that betoken an approaching storm, or one clearing away, can also be best effected by means of the

FIG. 54

stomp, as shown in Fig. 54. The landscape and foliage, where outlined against the sky or dark clouds, is rendered with a sharp pencil in fine, light touches. Atmospheric

effects can best be produced with the stomp. In rendering cloud effects, its wielding point gives a soft, fleecy effect that can be obtained in no other way. In Fig. 54, the effect of the approaching storm is heightened by the feeling of movement in the little foliage that is expressed, as the trees and grasses appear wind swept. This effect is produced by causing the lines of the foliage to follow the direction of the clouds, and by rendering the clouds and landscape in dense tints and compact forms.

In some compositions it is desirable to keep the sky down to an even gray tint without clouds, as under these conditions it serves to bring out the middle distance and foreground.

A picture should seldom have more than one object of importance, and if an elaborate sky is introduced the entire landscape should be an accessory; on the other hand, if the center of interest is in the landscape, then the sky should be of a comparatively somber character.

MOUNTAINS

40. Mountains in themselves are full of interest in a picture and afford a subject for special and minute study. A mountain line is frequently of much value in securing a picturesque effect and it always lends distance and depth to a composition. This outline may be rugged, suggestive of rocky cliffs, or it may be smooth and graceful or softly undulating, according to the character of the subject depicted. As a rule, mountains form a distant feature, although they are occasionally introduced as middle distance with a more distant range to set them off.

Great consideration must be given to the introduction of mountains in any composition, as a mountain introduced in a broad level stretch of land would be as much out of place as an ocean steamer on a small creek. There is nothing to lead up to it, nothing to suggest its dignity or its majesty, and everything to cause it to appear out of place. The characteristic feature of the mountain is its outline. Even a slight elevation or a faint depression makes a great difference. If distant, a delicate gray tint on the shadow side

Fig. 55

must denote its uneven surface, and the outline of the lighter side must be profiled against the next distant mountain. The shading should grow more delicate as each form recedes into the distance, as shown in Fig. 55, where the thickly wooded mountain tongue extends into the water in the middle distance and the hazy peak beyond is scarcely a shade darker in color than the sky against which it is profiled. The last ridge should only be left visible by a soft outline, often with no shading at all—a mere hint of a mountain.

Where the mountain approaches the foreground sufficiently for its foliage to be visible, it must be represented by a light, general-tone rendering with a soft, broad-edged pencil, or a stomp, and the foliage worked against it, as shown in Fig. 55. The foliage must not be made too distinct, however, as a mountain must always be somewhat distant from the eye in order to embrace its entire outline, and the details of the foliage at such a distance cannot be clearly seen.

41. The immediate foreground, where introduced against a mountain, middle distance, or distance, is of vast importance and should be suggestive of climate or locality. Apple trees and other orchard growths would be highly out of place in such a composition, whereas Adirondack birches and Norway pines are in perfect harmony. The existence of pines is suggestive of a rugged, barren climate and they are particularly harmonious in a rocky landscape with heavy boulders and other irregular forms in the foreground. The eye is easily led along to the mountain elevation, and a suggestion of its power and grandeur may be produced by the surroundings. On the other hand, a quiet valley or a woodland scene suggestive of repose requires unobtrusive forms, and a distant mountain form will lend to it the desired effect. It should be soft and hazy in outline, breaking into the horizon, and gradually growing fainter as it melts away into the sky. This is shown in Fig. 56, where the distant mountain is of little importance in itself, but its presence gives emphasis to the foreground.

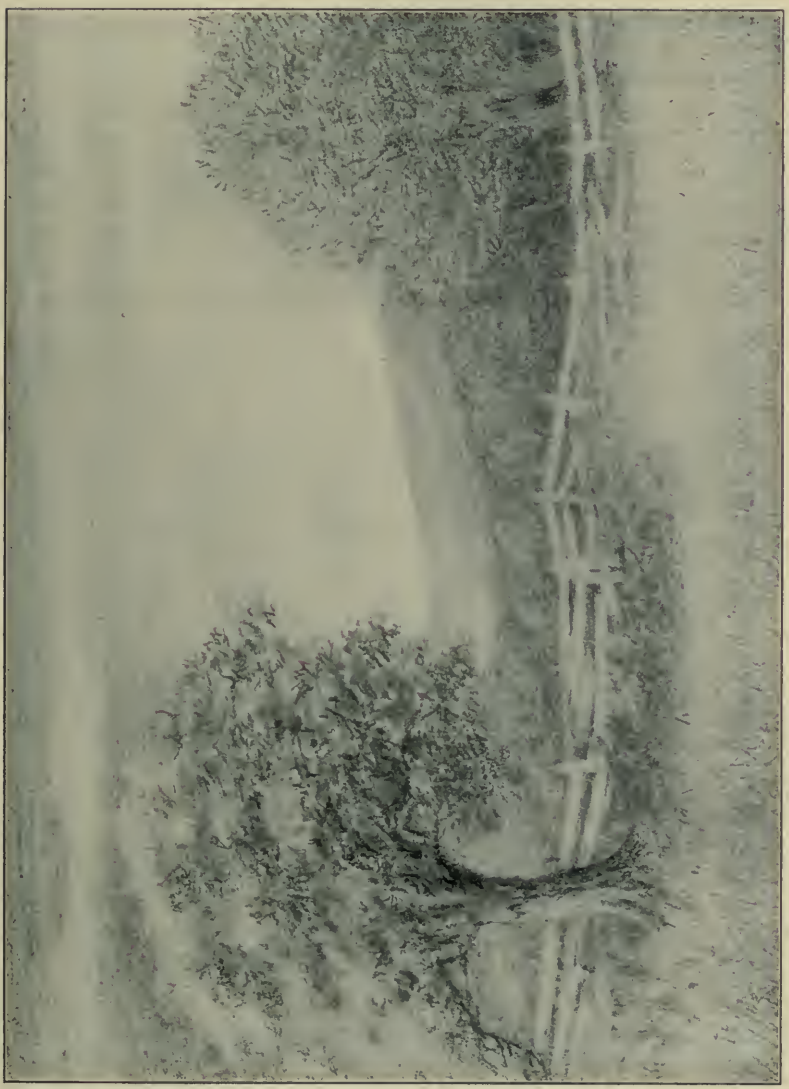

FIG. 56

The division of light and shade in such a subject is not always easy to manage. The apple tree on the left is in blossom and forms a prominent detail in the foreground; the fence is in strong sunlight and the trees at the right are touched with spots of light where the sun falls on them. Light falls also on the distant mountain and the grasses in the foreground catch it in broad patches, but the mountain must be made little of, and the apple tree and the fence introduced as a connecting line of sunlight, softened somewhat as it falls on the trees at the right, as these are more distant, and the emphasis in the sunlight effects expressed

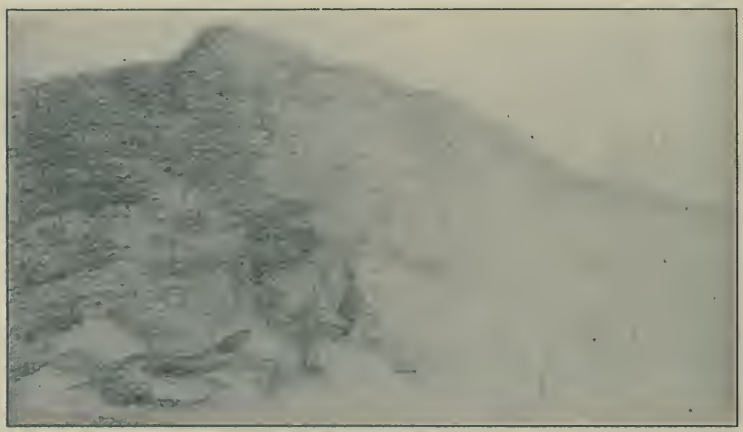

FIG. 57

on the blossoms of the apple tree and the grass of the foreground. This is effected by passing over the trees on the right a light, even tint that is scarcely perceptible and breaking the sky line of the mountain with a softened tint of the sky, which makes it a degree paler. The blossoms on the apple tree are brought out by a dark cloud back of them.

Many mountains or cliffs have little vegetation on them and the seams and rough, stony surfaces show plainly in some places, while others are covered with soft verdure. No mountain, however, should be represented with an even mass of foliage, as it is too monotonous to be picturesque and rarely exists in nature.

In Fig. 57 is shown a rocky cliff, from which the student can learn the mode of handling these surfaces. The softening of the tints, effected by both perpendicular and horizontal lines, gives to the illustration that cold crudeness so characteristic of this class of objects. The distinctness with which the irregularities show determine the prominence of the detail and the extent to which it claims recognition in the foreground. It can be made to retire by blending tints closer together into an even tone, or brought into prominence by showing the rough jaggedness of the crags and crevices. In some of these clifflike formations vegetation may be represented, but it should be of a wild character, in keeping with the general subject.

BUILDINGS

42. Buildings as an accessory to landscapes must be introduced entirely with a view to environment. Usually formal in shape, they are severe and difficult to introduce into anything of as wild a character as nature's formations. Where architectural effects are to be obtained, the relations are reversed, as the landscape is then an accessory to the architectural subject. An artistic country house or a cabin sometimes adds a note to the picture and gives life to it, and one or more figures add a note of human interest. When appropriately chosen, they are always a pleasing accessory, but must be in harmony with their surroundings. A happy finishing touch to a picture is only imparted when the figure carries out the sentiment of the landscape.

The old house in Fig. 58 is such as is frequently seen in picturesque surroundings, set close beside a stream or pond from which it is separated by the general highroad. In an illustration of this kind the house gives a feeling of habitation to the locality. The road, though devoid of figures, gives a feeling of direction, or leading to something definite, where habitations are represented along its side, and the loneliness of the single house is removed by the suggestion of a neighboring one in the distance.

Fig. 59 combines nearly all of the details that have been considered in this Section. We have a near mountain, an old cabin, and a small figure; the receding mountains become more and more delicate in touch as they disappear into the cloudy sky, and a very light background is used for the shaded trees on the left. The little figure near the cabin gives life to the subject, whereas the mountain scenery suggests a general loneliness in the surroundings. The length of the shadows shows that it is late in the day, while

Fig. 58

the intensity of the shadow in the foreground helps to intensify the light on the mountain and emphasizes the distance.

In delineating the effect of distance full attention must be given to the force of the foreground; as objects in the middle distance must be softened and made less definite, so distant objects must be much more softened and less definite than the middle distance. Proportioning of details, of course, is of greatest importance. No effect of distance is possible if the objects are not reduced in the proper degree. Softened tints will be of no avail in giving effects of distance if the distant objects are larger than those of the middle distance, but with the endless change and delicacy of gradation

FIG. 59

and a proper reduction in scale of the objects, the student can produce almost unlimited effects in these details. The most distant object should be kept delicate and flat in tone. Strong lights or shadows destroy the effect and all minute details are lost to the eye as objects recede.

COMPOSITION

43. When the student looks for a subject outdoors, he should always bear in mind that certain details of his selection are most important. He should not attempt to include too much at first. Having found an interesting subject that seems to contain abundant material for his picture, he should scan it carefully and choose sparingly for his picture. It takes but little to make a good picture, if the subject is well chosen and well done. The simplest subject is often the most telling, when completed. A beginner is apt to be too ambitious for his untried capacity; it is therefore best to commence with small things and those that are easy of execution. The student will then unconsciously extend his work as his ability to render more difficult objects increases.

As he looks over the landscape spread out under his eye, his first feeling will be one of bewilderment as to where to commence. To make the vast plane, proceeding as far as the eye can reach, has apparently no limit with the pencil, but there is a mark which the student must set for himself: he must decide what is most interesting. His method of procedure can be the same as is detailed in the description of Fig. 48. He must choose as his starting point something prominent in the foreground as an object of measurement for everything in the picture. If the middle distance appears too prominent in his sketch, his proportion is probably wrong. It does not matter if he has to begin all over again. Nothing is lost by such errors, as the experience gained is worth the time. A good start is worth a great deal, but the student should proceed with his work slowly, never hurrying through any part of it, and giving all the time necessary to each section, thereby saving time on the whole.

Having drawn in a sketchy way the general foreground, he must be careful of the space between it and the horizon. The beginner is apt to misjudge space in drawing and imagine things will fall into place even if they are set a little too high, but this idea must be abandoned at once. If his distance seems to push forwards and up on the plane of his picture, there is but one remedy, and that is to do it over, lessening the space between it and the nearer portions. Correct relative proportions and spacing of objects is the great indispensable necessity for making a successful drawing from nature, and the student should shut off the space between his hands, moving them slowly from side to side until he includes between them such material as strikes his fancy for the picture. Here the most prominent object that arrests his eye must be sketched first, and all others made accessory to it.

As the student starts to work he should ask himself three questions: What do I see? How shall I represent it on paper? What shall be my main idea in its rendering? The practical answer to these three questions will give him a key to the entire situation, and he can center his interest on the principal subject and work from that. This is his gauge and measure for all other objects so far as the expression of size or light and shade is concerned, and in this way he will get his general proportions for everything.

If he starts out to find a certain subject he has in mind, the chances are that he will not find it as he expected. He will find something better, or something that may be substituted for it, all depending on his art of seeing and how well it is developed. If he sees something that suits him as well or better than his fancied subject, he should render what is before him.

44. In sketching from nature, the student should learn always to take promptly the thing that presents itself to him picturesquely. He should not count on doing it some other time, as his humor may be different at that time and the subject may appeal to him differently. Time and occasion

wait for no one, and many an interesting bit of sketching is lost by putting it off. While fixed objects cannot run away they change materially, and it is best to secure them when they are in sight. Detached bits and details picked up at odd times may turn out to be the gems of one's summer portfolio, and when one chances on an interesting piece of foreground—an especially strong group of trees, a pretty clump of birches, a pool of water, or other interesting accessory—he should not neglect the opportunity to make a sketch of it, even though it be but a hasty one.

Choosing the subject for a picture and choosing the subject for a sketch are quite different problems. In selecting, therefore, the student must have a definite purpose. If he desires study and practice in some particular direction he should leave out all that will detract from the careful rendering of the theme he needs. When in search of material for a picture, he may choose more widely. In a picture he needs to concentrate the interest and not scatter it over the entire subject. If he ignores this important fact, he loses force in his strongest part. He should concentrate his forces where it will give the strongest effect, and he should decide this for himself. No teacher's advice is to be desired in this case, as no two persons see a thing in exactly the same way. One may emphasize an object that carries a special interest for him, and lessen the import of others to enforce his idea. Another may ignore almost entirely a point that the first may consider supreme, and make what he reduced to secondary importance the prominent theme in his picture, to which all the others are subordinate. Each in his own way is true to his own intuition and individuality and each may produce an excellent picture.

So, what is looked on as a subject from nature is in reality many subjects waiting for their different translations through different eyes and different minds. Nature is an inexhaustible well from which each of us may drink what best satisfies him.

The old ideas concerning specialties in art had their advantages in certain ways. There is no doubt that one

kind of subject faithfully repeated over and over begets perfection. Yet, the broader theory of the modern art schools produces greater variety and more general uniformity of good work. We see the same artist drawing all kinds of subjects and doing them all well, and it is a question whether earnest study in any path of art does not help toward the fuller and better performance of every other branch. Nature is not only indulgent and generous in her gifts, but she is also consistent. The same elements that make up her laboratory in the human brain for the development of a landscape artist, also furnish material for the entire list of art translators.

THE AMERICAN VIGNOLA

PART 1

THE FIVE ORDERS

BY WILLIAM R. WARE

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THIRD EDITION

SCRANTON

INTERNATIONAL TEXTBOOK COMPANY

NOTICE

The elements of architecture according to the proportions first established by the Italian architect, Giacomo Barozzi da Vignola, in the year 1563, have become identified with that writer's name, so that at the present time the term *"Vignola"* is almost universally used to indicate a treatise on the five orders of Classic Architecture. This Instruction Paper is a reprint of Part 1 of The American Vignola, prepared by Professor Ware for the especial use of American students.

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PREFACE TO THIRD EDITION

This edition of "The American Vignola" is a reprint of the first and second editions, with a few changes and extensions of the text suggested by the author. The text illustrations have been redrawn, and have been enlarged so as to be of more practical value to the student. The volume has been reduced to octavo size, and the plates have been inserted on guards. It is hoped that the advantages gained by these changes will be apparent to those students for whom this book is especially published, and that suggestions for further improvement will be submitted to the publishers as they may occur to the reader.

INTERNATIONAL TEXTBOOK COMPANY.

PREFACE TO FIRST EDITION

In January, 1859, I went from Mr. Edward Cabot's office in Boston, where I had been for two or three years, to join the little company of half a dozen young men who were studying architecture in the Studio Building in Tenth Street, under the inspiration of Mr. Richard Hunt. Mr. Hunt had just returned from Paris and was eager to impart to younger men, though we were not much his juniors, what he had learned in the *École des Beaux-Arts* and in work upon the New Louvre. We had all, I believe, had more or less of office experience, but those were the days when the Gothic Revival was at its height, and Mr. Hunt found most of us unfamiliar with Classical details and quite unskilled in their use. I, at any rate, knew hardly a touch of them, and I remember well the day when, as I was carefully drawing out a Doric Capital according to the measurements given in my *Vignola*, Mr. Hunt took the pencil out of my hand and, setting aside the whole apparatus of *Modules* and *Minutes*,

showed me how to divide the height of my Capital into thirds, and those into thirds, and those again into thirds, thus getting the sixths, ninths, eighteenths, twenty-sevenths and fifty-fourths of a Diameter which the rules required, without employing any larger divisor than two or three.

It seemed as if this method, so handy with the Doric Capital, might be applied to other things, and I forthwith set myself to studying the details of all the Orders, and to devising for my own use simple rules for drawing them out. The present work presents the results of these endeavors. Experience in the class-room has, meanwhile, amplified and extended them, and they have at many points been improved by the suggestions of my colleagues.

I am particularly indebted to Professor Hamlin and to Mr. W. T. Partridge for some ingenious applications of the 45-degree line to the Doric Entablature and to the Corinthian Capital, and for an analogous employment of the 60-degree line.

Finding that the plates in which, for the convenience of my own students, I have embodied these results are somewhat in demand by others, I now publish them in the present volume, adding such text and marginal illustrations as the subject matter seems to require. The plates have been drawn out for me anew by Mr. Partridge, as have also most of the Illustrations. The rest have been taken from standard publications, especially from Bühlmann's "*Architecture of Classical Antiquity and the Renaissance*," which has furnished twenty-six of the figures.

The forms and proportions here set forth are, in the main, those worked out by Giacomo Barozzi da Vignola and first published by him at Rome in the year 1563, as those which, in his judgment, best embodied the best practice of the ancient Romans. Other systems have been presented by Alberti, Palladio, Scamozzi, Serlio, Sir William Chambers, and others. But Vignola's Orders have generally been accepted as the standard. His works have been frequently republished, and recourse must be had to them for minute information in regard to details. But the dimensions given

in this book, and the methods of determining them here described, will suffice for the execution of all drawings and designs which are made to a small scale.

This volume is concerned only with Columns, Pilasters and Entablatures, Pediments, Pedestals and Balustrades. The employment of these Elements in the Composition of Doors and Windows, Wall Surfaces, external and internal, Staircases, Towers and Spires, Arches and Arcades, Vaults and Domes, and other architectural features, will, I hope, at a later day be made the subject of a separate treatise which will be the natural sequel to this one.

After the chief part of this volume was in press my attention was directed to a somewhat similar work by the celebrated James Gibbs, the architect of St. Martin's-in-the-Fields and of St. Mary-le-Strand. He published in London, in 1732, a series of plates showing the Orders and their applications with a brief descriptive text. The title page reads: "Rules for Drawing the several Parts of Architecture in a more Exact and Easy Manner than has been heretofore Practiced, by which all Fractions, in dividing the Principal Members and their Parts, are Avoided." The book begins with an *Address to the Reader* which opens as follows:

"Upon examination of the common ways of drawing the Five Orders of Architecture, I thought there might be a method found out so to divide the principal Members and their Parts, both as to their Heights and Projections, as to avoid Fractions. And having tried one Order with success, I proceeded to another, till at length I was satisfied it would answer my intention in all; and I doubt not but that the Method here proposed will be acknowledged by proper Judges to be the most exact, as well as the easiest, that hath as yet been published."

I find on examining the plates that, though they follow an entirely different system, they have anticipated some of the methods of the present work.

WILLIAM R. WARE.

October 1, 1902.

School of Architecture, Columbia University.

I L T 153—21

THE AMERICAN VIGNOLA

THE FIVE ORDERS

INTRODUCTION

1. **A building** is a shelter from rain, sun, and wind; this implies a *Roof*, and *Walls* to support it. If the walls entirely enclose the space within, there are *Doorways* for access, and *Windows* for light. Roofs and walls, doors and windows are the essential features of buildings.

2. **Roofs** may be flat, sloping, or curved. A roof with one slope is called a *Lean-To*, Fig. 1. When two sloping roofs rest upon parallel walls and lean against each other, they meet in a horizontal *Ridge*, Fig. 2, at the top, and form a *Gable* at each end. Roofs that rise from the same wall in

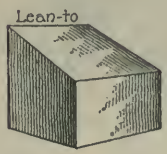

FIG. 1

FIG. 2

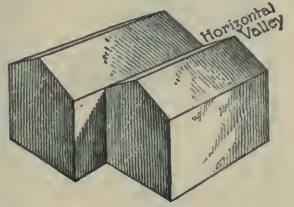

FIG. 3

opposite directions form a *Horizontal Valley*, Fig. 3, at the wall. If the walls make a projecting angle, the roofs intersect in an inclined line called a *Hip*, Fig. 4. If the walls meet in a reentering angle, the inclined line of intersection is called

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a *Valley*. Circular walls carry conical, Fig. 5 (*a*), or domical roofs, Fig. 5 (*b*).

If there is more than one story, the flat roof of the lower story becomes the *Floor* of the story above. If the roof extends beyond the wall that supports it, the projection is

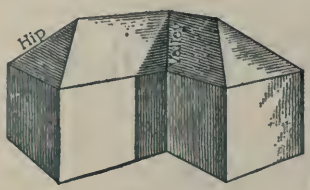

FIG. 4

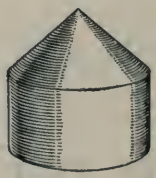

FIG. 5 (*a*)

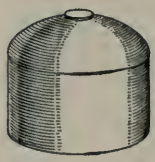

FIG. 5 (*b*)

called the *Eaves*, Fig. 6. If the wall also projects, to support the extension of the roof, the projection is called a *Cornice*, Fig. 7. The principal member of a cornice, which projects like a shelf, is called a *Corona*, Fig. 8.

3. Walls are generally made wider just at the bottom, so as to get a better bearing on the ground. This projection is the *Base*, Fig. 9. A similar projection at the top is called a *Cap*, or, if it projects much, a *Cornice*, as has been said. A low wall is called a *Parapet*. A short piece of wall about as long as it is thick is called a *Post*, and if it supports something, a *Pedestal*, Fig. 10; the part between its Cap and Base

FIG. 6

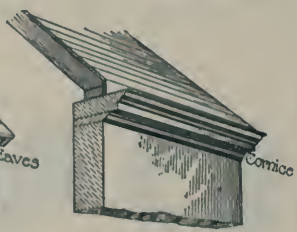

FIG. 7

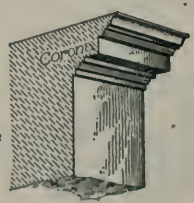

FIG. 8

is then the *Die*. A tall post is called a *Pier*, Fig. 11, if it is square, and a *Column* if it is round. Caps of piers and columns are called *Capitals*, and the part between the Cap and the Base, the *Shaft*. The flat upper member of a Capital is called the *Abacus*.

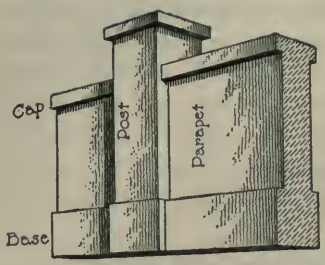

FIG. 9

FIG. 10

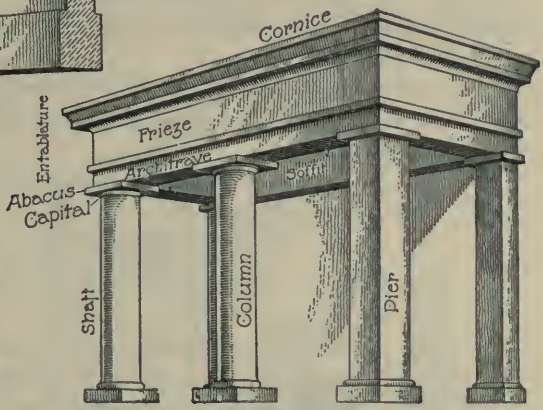

FIG. 11

Colonnade

FIG. 12

Arcade

FIG. 13

4. A **beam** that spans the space between two piers or columns, or between a pier or column and a wall, is called an *Architrave*, or *Epistyle*. Above it, between the Architrave and the Cornice, there is generally a little strip of wall called the *Frieze*. Architrave, Frieze, and Cornice constitute the *Entablature*. A series of columns is called a *Colonnade*, Fig. 12. The spaces between piers or columns are sometimes spanned by *Arches*, a series of which is called an *Arcade*, Fig. 13.

The space between two walls is sometimes covered by a sort of continuous arch, called a *Vault*, instead of by a floor or roof, Fig. 14.

The under surface of a beam or architrave is called its *Soffit*, and the same name is used also for the *Intrados*, or under surface of an arch or vault. The upper surface, or back of an arch, is called the *Extrados*, and the triangular space of wall above is called a *Spandrel*.

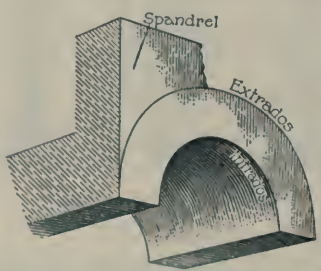

FIG. 14

The Wall, the Pier, and the Column, with or without a Pedestal, constitute the chief supporting members; the Frieze and Cornice, with the roof that rests upon them, constitute the chief part of the load they carry. The Architrave, the Arches, and the Spandrels form part of the load, relatively to what is below them, but are supporting members relatively to what is above them.

5. Besides being valuable as a shelter, a building may be in itself a noble and delightful object, and architects are builders who, by giving a building good proportions and fine details, and by employing beautiful materials, make it valuable on its own account, independently of its uses. Their chief instruments in this work are **Drawings**, both of the whole building and, on a larger scale, of the different features that compose it and of their details, which are often drawn full size. These drawings comprise *Plans*, *Sections*,

Elevations, and *Perspective Views*, Fig. 15. They serve to explain the intention of the architects to their clients and to their workmen.

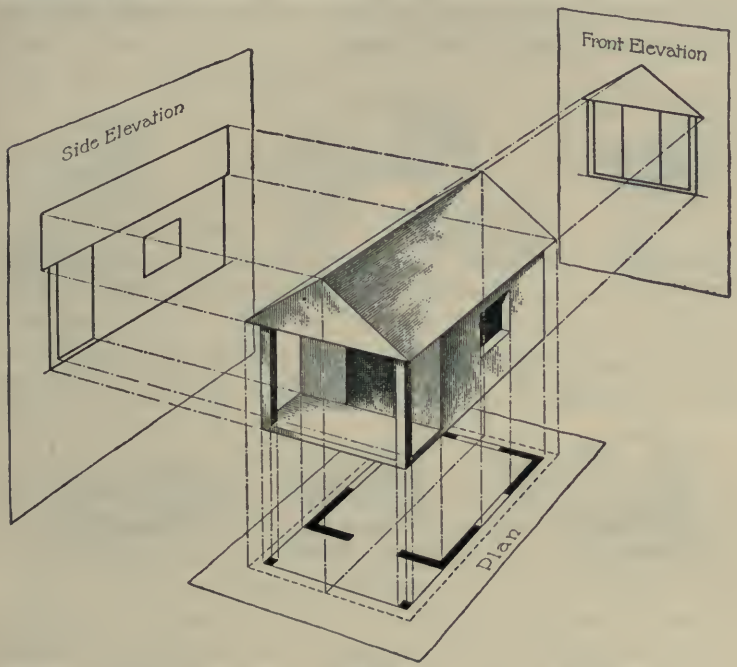

FIG. 15

MOULDINGS—PLATE I

6. The simplest decorative details and those that are most universally used in buildings are called **Mouldings.**

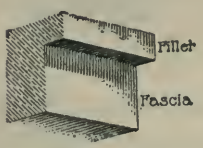

FIG. 16

FIG. 17

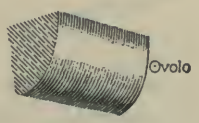

FIG. 18

They are plane or cylindrical surfaces, convex, concave, or of double curvature, and they are sometimes plain and sometimes enriched by carving. They are called by various

technical names: Greek, Latin, Italian, French, and English. The cross-section of a moulding is called its *Profile.*

A small plane surface is called a *Band*, *Face*, or *Fascia*, Fig. 16, and if very small a *Fillet*, *Raised* or *Sunk*, Fig. 17, *Horizontal*, *Vertical*, or *Inclined.*

FIG. 19

FIG. 20

FIG. 21

A convex moulding is called an *Ovolo*, Fig 18, *Torus*, Fig. 19, or *Three-Quarter Moulding*, Fig. 20, according to the amount of the curvature of its profile. A small Torus is called a *Bead*, Fig. 21, *Astragal*, or *Reed*, and an elliptical one, a *Thumb Moulding*, Fig. 22. Concave mouldings are, in like manner,

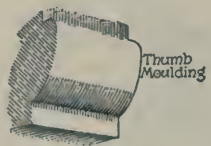

FIG. 22

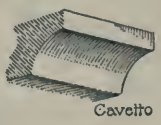

FIG. 23

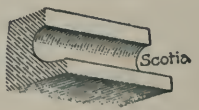

FIG. 24

called *Cavetto*, Fig. 23, *Scotia*, Fig. 24, or *Three-Quarter Hollow*, but the term Scotia (darkness) is often used for any hollow moulding. A Cavetto tangent to a plane surface is called a *Congé*, Fig. 25.

FIG. 25

FIG. 26 (*a*)

FIG. 26 (*b*)

A moulding with double curvature is called a *Cyma*, or Wave Moulding. If the tangents to the curve at top and bottom are horizontal, as if the profile were cut from a horizontal wavy line, it is called a *Cyma Recta*, Fig. 26; if vertical, as if cut from a vertical line, a *Cyma Reversa*, Fig. 27. The Cyma Recta is sometimes called Cyma Reversa, Fig. 26 (*c*), when

it is turned upside down. But this leads to confusion. The Cymas vary also, Fig. 28, in the shape and relative size of their concave and convex elements. A small Cyma is called a *Cymatium*. A small moulding placed above a Band, or any larger moulding, as a decoration, is also called a *Cymatium*, Fig. 29, whatever its shape.

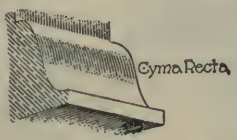

Fig. 26 (*c*)

Fig. 27 (*a*)

Fig. 27 (*b*)

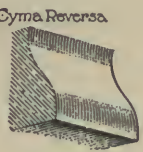

Fig. 27 (*c*)

When a convex and a concave moulding, instead of being tangent, come together at an angle, they constitute a *Beak Moulding*, Fig. 30.

Some architectural features, such as Bases, Caps, and Balusters, consist entirely of mouldings. Others consist mainly of plane surfaces, mouldings being employed to mark the boundary between different features, as between the Architrave and Frieze, or between different members of the same feature, as

Fig. 28

Fig. 29

Fig. 30

between the Shaft of a column and its Capital, Fig. 31. In these cases the mouldings, since they occur on the edges of the stone blocks, indicate, while they conceal, the position of the joints of the masonry. Mouldings are often placed also in the internal angle where two plane surfaces meet, as is the case between the Frieze and the Corona of the Cornice, and under the Abacus of the Capital. When placed upon the external angle formed by two planes, they are, in the Gothic

Styles, Fig. 32, often cut in, so as to lie down below the surface of both planes; but in the Classical Styles, they pro-

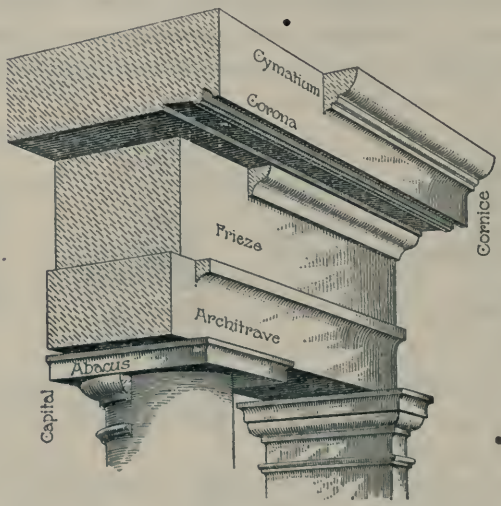

FIG. 31

ject beyond the plane of one of the surfaces, like a little cornice, as is often seen in the Abacus of a Capital.

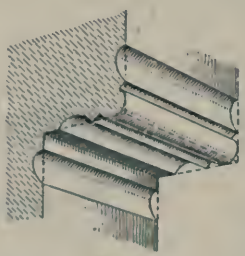

FIG. 32

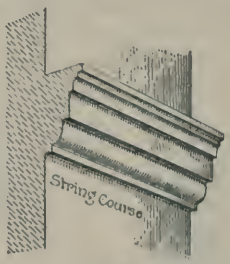

FIG. 33

Horizontal Mouldings, separating plane surfaces, are called a *String Course*, Fig. 33.

TABLE OF MOULDINGS, PLATE I

Plane.—Face, Band, or Fascia; Beveled, Inclined, or Splay Face; Fillet, vertical, horizontal, or beveled, Raised or Sunk.

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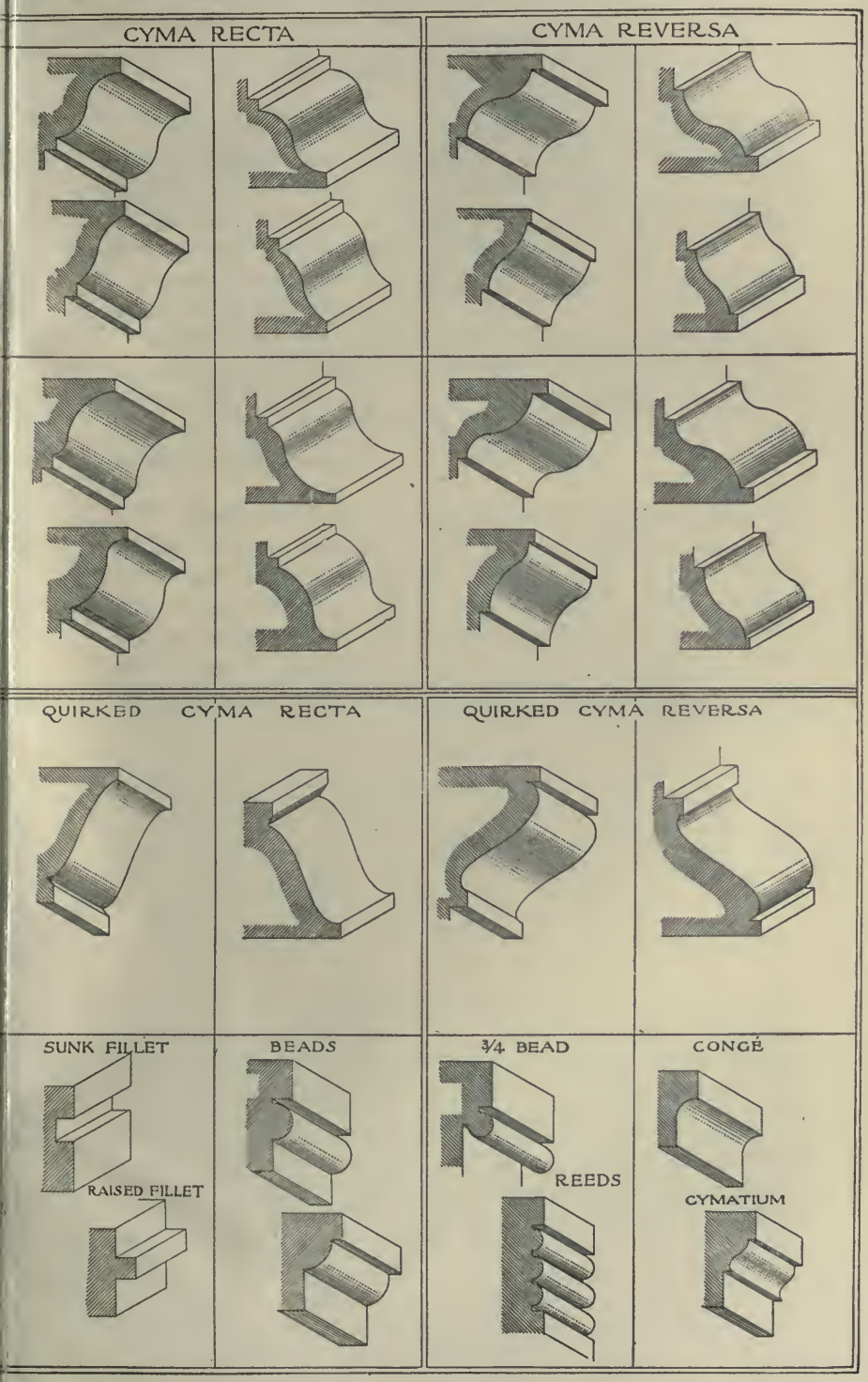
DINGS


CYMA RECTA
CYMA REVERSA
QUIRKED CYMA RECTA
QUIRKED CYMA REVERSA
SUNK FILLET
RAISED FILLET
BEADS
¾ BEAD
REEDS
CONGÉ
CYMATIUM

Convex.—Ovolo, or Quarter Round; Torus, or Half Round; Thumb Moulding, or Elliptical Torus; Three-Quarter Round; Bead, Astragal, or Reed; Three-Quarter Bead.

Concave.—Cavetto, or Quarter Hollow; Congé; Half Hollow; Scotia; Three-Quarter Hollow.

Double Curvature.—Cyma Recta; Cyma Reversa; Cymatium; Beak Moulding.

Besides the differences of size and shape already mentioned, and indicated in the table, mouldings of the same name differ in the kind of curve they employ. They may be arcs either of circles, ellipses, parabolas, or hyperbolas, or of any other curve.

7. Styles.—Different systems of construction have prevailed among different races, some employing only the Beam and Column, some also the Arch and Vault. In the choice of mouldings, also, some have adopted one set of forms, some another. The forms employed by the Greeks and Romans constitute what are called the Classical Styles; those used in the Middle Ages, the Byzantine, Romanesque, and Gothic Styles. Some of the Gothic mouldings have special names, such as Boltel, Scroll, etc.

At the close of the Middle Ages, about 400 years ago, the Classical styles were revived, as the Medieval styles have been during the last hundred years. Both are now in use. The styles of Egypt, India, and China are employed only occasionally and as a matter of curiosity.

THE ORDERS

8. In the Classical styles, several varieties of Column and Entablature are used; these are called the **Orders.** Each order, Fig. 34, comprises a Column with Base, Shaft, and Capital, with or without a Pedestal, with its Base, Die, and Cap, and is crowned by an Entablature, consisting of Architrave, Frieze, and Cornice. The Entablature is generally about one-fourth as high as the Column, and the Pedestal one-third, more or less.

The principal member of the Cornice is the Corona, Fig. 35. Above the Corona, the Cornice is regularly terminated by a member originally designed to serve as a gutter to receive the water running down the roof. It generally consists of a large Cyma Recta, though the Ovolo and the Cavetto are often used. It is called the *Cymatium*, in spite of its large size, and whatever its shape.

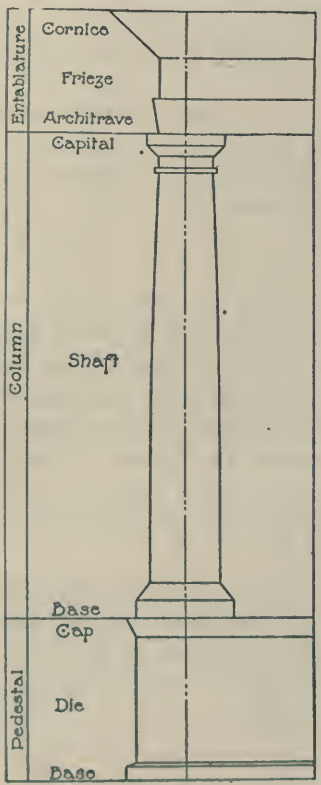


Fig. 34

Note. — The word Cymatium thus has three meanings: (1) A small Cyma; (2) a small crowning member, of whatever shape, though it is most frequently a Cyma Reversa; (3) the upper member of a Cornice, occupying the place of a gutter, whatever its shape, though it is generally a large Cyma Recta. In Classical Architecture, the Cyma Recta seldom occurs, except at the top of the Cornice and at the bottom of the Pedestal.

It would seem as if a cornice that occurs at the top of a wall and carries the edge of a roof would properly have a Cymatium, this being the place for a gutter, and that Cornices used as String Courses, half way up a wall, would

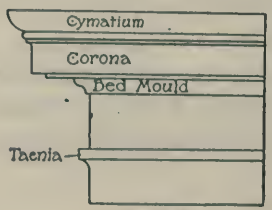


Fig. 35

naturally be without this member. But the significance of the Cymatium has frequently been overlooked, in ancient times and in modern. Many Greek temples have a Cymatium on the sloping lines of the gable, where a gutter would be useless, Fig. 120, and none along the Eaves, and in many modern buildings the cornices are crowned by large Cymatia in places where there are no roofs behind them.

The Corona is supported by a Moulding or group of Mouldings, called the *Bed Mould*. A row of brackets, termed *Blocks*, Fig. 36, *Modillions*, or *Mutules*, Fig. 37, according to their shape, resting on the Bed Mould and supporting the soffit of

the Corona, is often added. At the top of the Architrave is a projecting moulding that, when square, is called a *Tænia*, and the face of the Architrave is often broken up into two or three Bands or Fascias, Fig. 38.

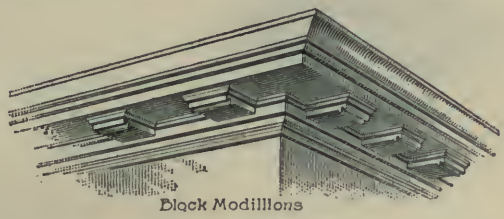


Fig. 36

The Abacus of the Capital also has a sort of bed mould beneath it, which, when convex, is called an *Echinus*, Fig. 39, from the sea shell, Fig. 40, which it resembles in shape.

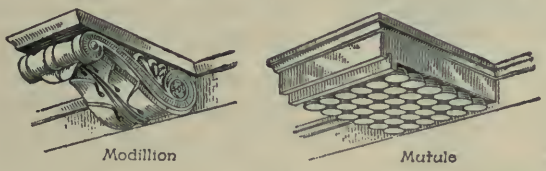


Fig. 37

The little Frieze below it is called the *Necking*. But if the bed mould under the Abacus is concave, it dies into the necking like a large Congé, and the two together constitute the

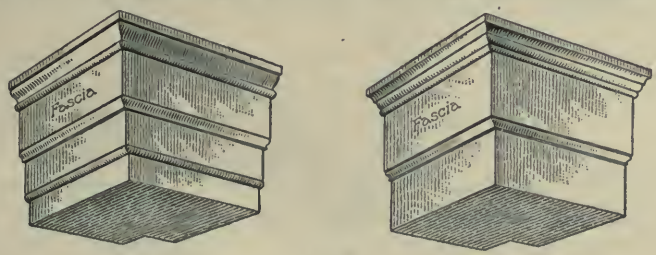


Fig. 38

Bell of the Capital, Fig. 41. The Abacus is square in plan, but the Echinus, or the Bell below it, is round, like the column.

At the top of the shaft is a member called the *Astragal*, consisting of a Bead, Fillet, and Congé. It has a flat surface

on top, as wide as the projection of the Congé, Fig. 42. At the bottom of the shaft is another Congé, below which is a broad fillet called the *Cincture*, Fig. 43. The Base generally

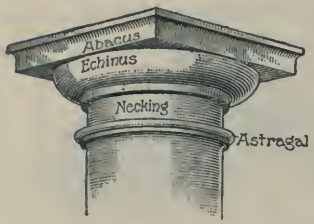


Fig. 39

Fig. 40

has, below the base mouldings, a plain member called the *Plinth*, which is square in plan like the Abacus.

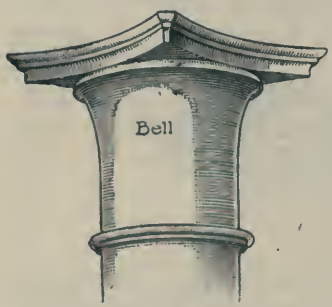


Fig. 41

The Shaft diminishes as it rises, Fig. 44, the upper diameter being only five-sixths of the lower, and the outline is not straight, but curved. This curve, which is called the *Entasis*, or bending, as of a bow, generally begins one-third of the way up, the lower third being cylindrical. The Entasis is not to be confounded with the *Diminution*, which is generally one-sixth, the upper diameter being five-sixths of the lower.

Fig. 42

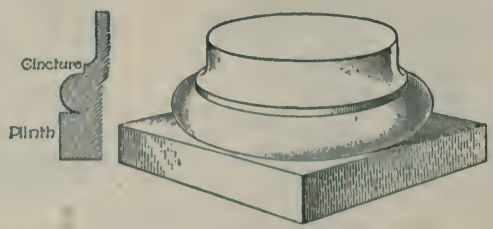


Fig. 43

Generally, the Pedestal also has a Corona and Bed Mould, but no gutter, above the Die, and a Base Moulding and Plinth below it.

9. In the choice and use of mouldings, the tastes and fashions of the Greeks and Romans were quite contrary to those of their successors in the Middle Ages. The Ancients preferred to use vertical and horizontal surfaces at right angles to each other, and seldom used an oblique line, or an acute or obtuse angle, as the Gothic architects did. They also preferred the Cyma Reversa, seldom enploying the Cyma Recta, which in the Middle Ages was rather the favorite. Moreover, as has been said, the Gothic architects, in decorating a corner or edge, often cut it away to get a moulding, but the Ancients raised the moulding above the plane of the surface to which it was applied. In the composition and sequence of mouldings also, the Classical architects generally avoided repetition, alternating large and small, plain and curved, convex and concave. The convex and concave profiles seldom describe an arc of more than 180 degrees, and except in the case of the Beak Moulding and of the Bead, mouldings are always separated by Fillets. When a moulding is enriched, it is generally by carving ornamental forms, Fig. 45, upon it that resemble its own profile. The Greeks frequently employed elliptical and hyperbolic profiles, while the Romans generally used arcs of circles.

FIG. 44

Among the Greeks, the forms, Fig. 46, used by the Doric race, which inhabited Greece itself and had colonies in Sicily and Italy, were much unlike those of the Ionic race, which inhabited the western coast of Asia Minor, and whose art was greatly influenced by that of Assyria and Persia. The Romans modified the *Ionic* and *Doric* styles, Fig. 47, and also devised a third, which was much more elaborate than either of them, and employed brackets, called *Modillions*, in the Cornice. This they called the *Corinthian*, Fig. 48. They used also a simpler Doric called the *Tuscan*, Fig. 49, and a cross between the Corinthian and Ionic called the *Composite*, Fig. 50. These are the **Five Orders.** The ancient examples

vary much among themselves and differ in different places, and in modern times still further varieties are found in Italy, Spain, France, Germany, and England.

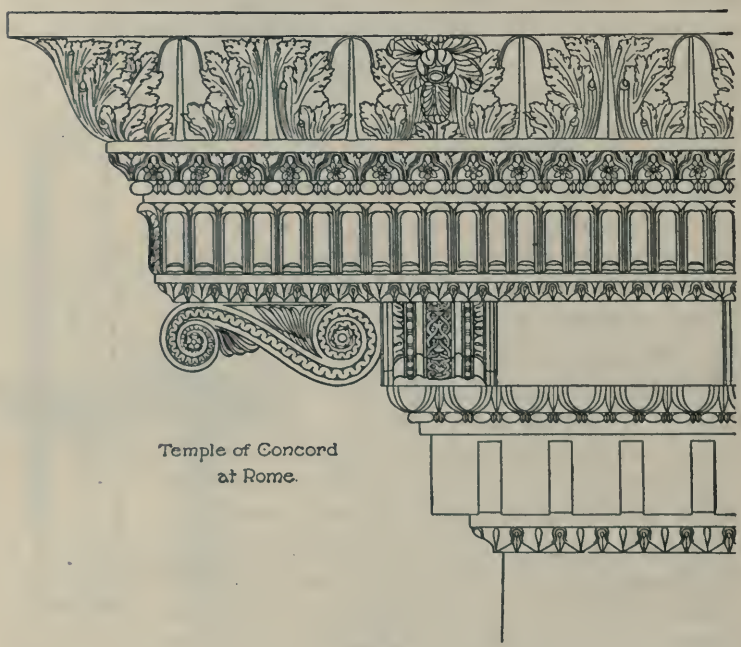


FIG. 45

The best known and most admired forms for the Orders are those worked out by Giacomo Barozzi da Vignola, in the 16th century, from the study of ancient examples. The Orders that are shown in the large plates almost exactly follow Vignola's rules.

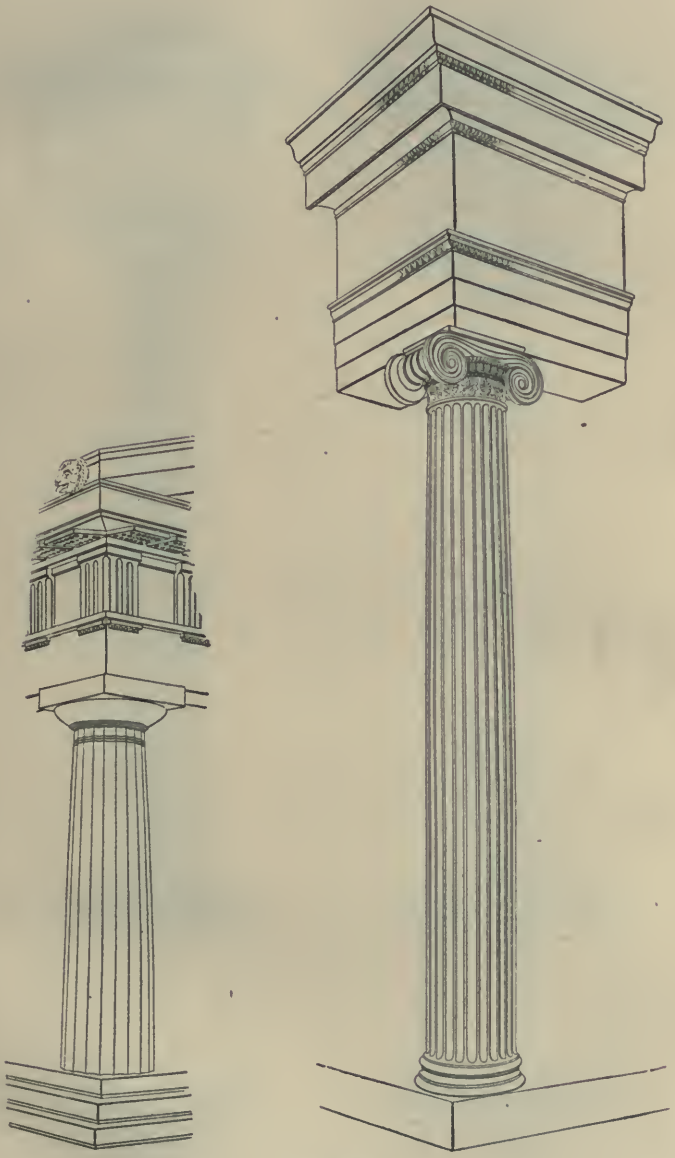
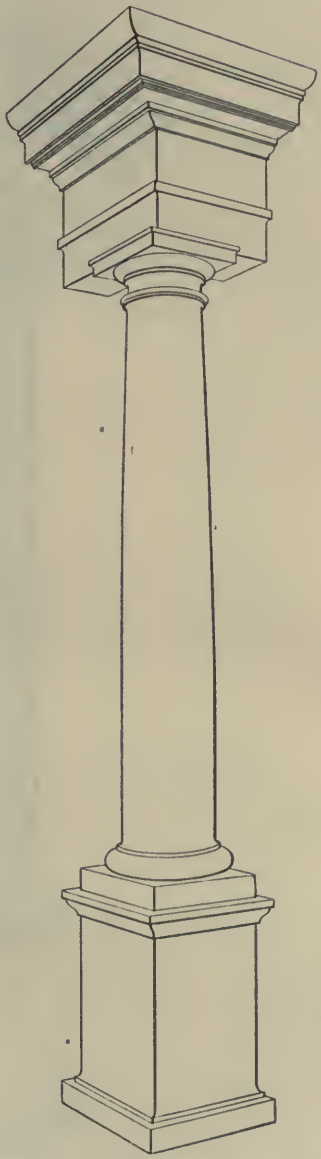


FIG. 46

FIG. 47

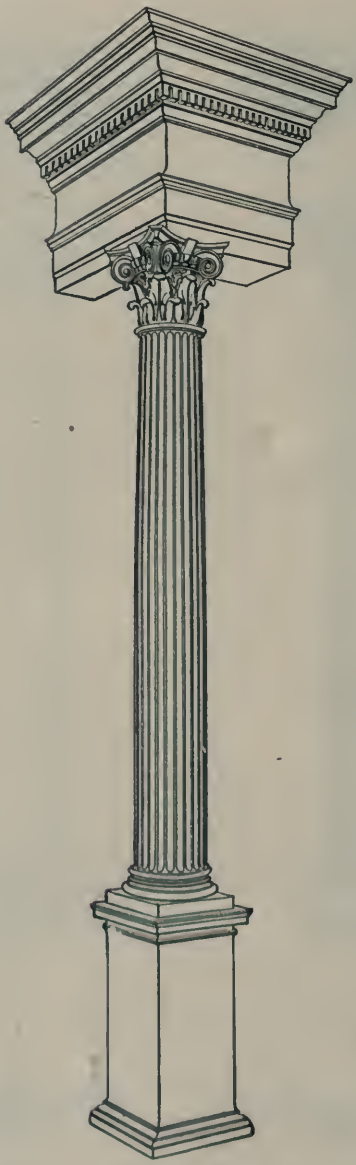
Corinthian

FIG. 48



Tuscan

FIG. 49



Composite

Fig. 50

COMPARISON C

TYPE OF ORDER	NAMES OF FEATURES			GREEK DORIC		TUSC
ENTABLATURE	1/4 to 1/5	CORNICE	CYMATIUM CORONA BED MOULD	2	1/2	1¾
		FRIEZE			3/4	
		ARCHITRAVE	TÆNIA		3/4	
COLUMN	1	CAPITAL	ABACUS ECHINUS NECKING	4-6	1/2	7
		SHAFT	ASTRAGAL CINCTURE			
		BASE	BASE MOULD PLINTH		NONE	
PEDESTAL	1/3 ±	CAP	CORONA BED MOULDING	NO PEDESTAL BUT THREE STEPS THE STYLOBATE		TH
		DIE				
		BASE	BASE MOULD PLINTH			THI

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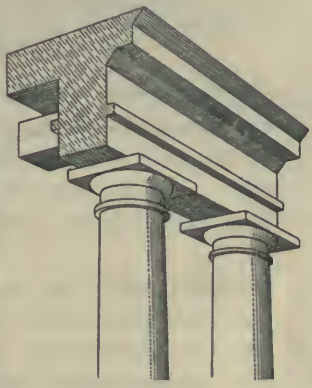
F THE ORDERS

	DORIC		IONIC		CORINTHIAN COMPOSITE		PERSPECTIVE VIEW
4		3/4		7/8		1	
2	2	3/4	2¼	6/8	2½	3/4	
2		1/2		5/8		3/4	
2		1/2		1/3 [1/2]		7/6	
	8	7	9	8	10	8⅓	
2		1/2		1/2		1/2	

AP IS ONE NINTH THE HEIGHT OF THE PEDESTAL

PEDESTAL 1/3
[VIGNOLA]

SE IS TWO NINTHS THE HEIGHT OF THE PEDESTAL



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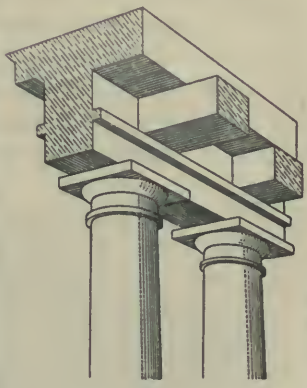

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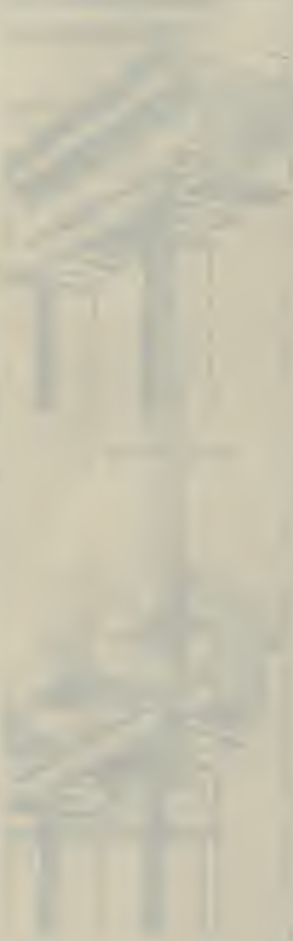


VIGNOLA'S ORDERS—PLATE II

10. *Plate II* shows the proportions of the Orders according to Vignola, in terms of the lower diameter of the columns. These vary in height from seven Diameters to ten.

NOTE.—It is worth noting that, in ordinary handwriting, the T, for Tuscan, looks like a 7; D, for Doric, like an 8; I, for Ionic, like a 9; Co, for Corinthian and Composite reminds one of 10.

The Entablature is in all of them ordinarily one-fourth the height of the column, but it is sometimes made as small as one-fifth. The projection of the Cornice is the same as its height, except in the Doric Order, where it is greater. The lower band of the Architrave is made to come in line with the upper face of the shaft.

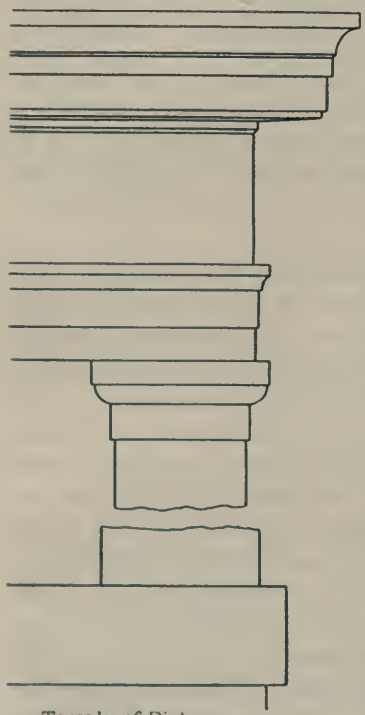
But it is only when seen in elevation that these relations obtain. When seen in perspective, as is generally the case, the cornice appears much larger, in proportion, and the frieze and architrave, being foreshortened, much smaller, and the architrave overhangs the shaft, Figs. 53 and 57.

In the Greek Orders, the Column is from five to ten Diameters in height and the Entablature always about two Diameters. In the Greek Orders, accordingly, the taller the Column, the lighter the Entablature, relatively; but in the Roman Orders, the taller the Column, the heavier the Entablature, actually. It follows that the weight of the Greek Entablature is proportioned to the diameter of the Column, irrespective of its height; of the Roman to the height of the Column, regardless of its diameter. The Romans put the least weight on the shortest and strongest supports. The Greek plan shows more regard to principles of construction, the Roman to principles of decorative composition.

Vignola used half of the lower diameter of the Column as his unit of measure, or *Module*. This he divided into twelve Parts for the Tuscan and Doric Orders, and into eighteen Minutes for the others, and he gives all the dimensions both of the larger members and of the mouldings in terms of Modules and Parts, or Minutes, sometimes using even the quarter Minute, or one one-hundred-and-forty-fourth of a

Diameter. But it is equally practicable and more convenient to use the whole Diameter as a unit of measure, dividing it only into Fourths and Sixths, and occasionally using an Eighth or a Twelfth.

In Plates IV, VI, VII, IX, XI, and XIII, the first column on the left shows the vertical dimensions as given in Plate II.



Temple of Piety

FIG. 51

In the second column, these divisions are subdivided into equal parts, the third column giving a further division of the dimensions thus obtained. Most of these dimensions can be stated in terms of sixths or fourths of the Diameter, as appears in the Tables. This analysis does not reach the smaller details, the shape and size of which must be learned by observation. Indeed, all these forms should be made so familiar that they can be drawn accurately from memory, these arithmetical relations being used only to test the accuracy of the result, or to discover how much the proportions adopted in any given case differ from the regular type. For Vignola's Orders are to be regarded only as an admirable standard that may be safely adopted when there is no occasion to do anything else, but which is to be departed from and varied whenever there is any reason for doing so. Vignola obviously so regarded them. He did not himself adhere closely to his own rules, or generally adopt his Orders in his own work. His Doric and Ionic are to be found, however, in the Villa Caprarola.

ELEVATION OF CAPITAL AND BASE

PLAN OF BASE

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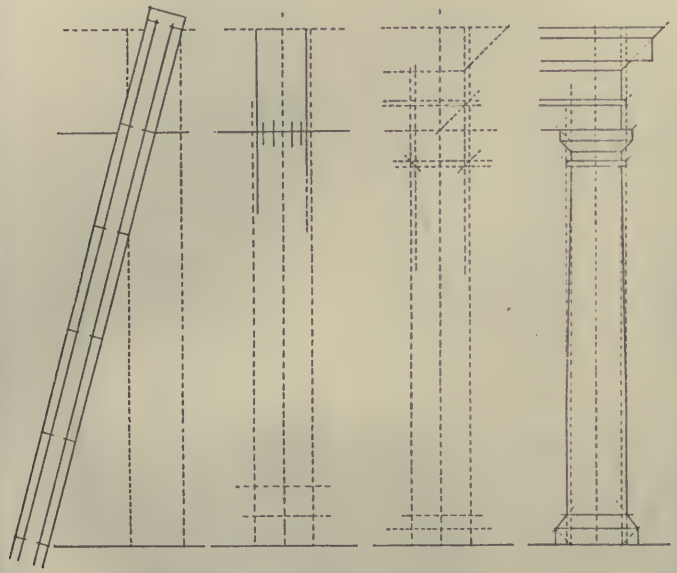
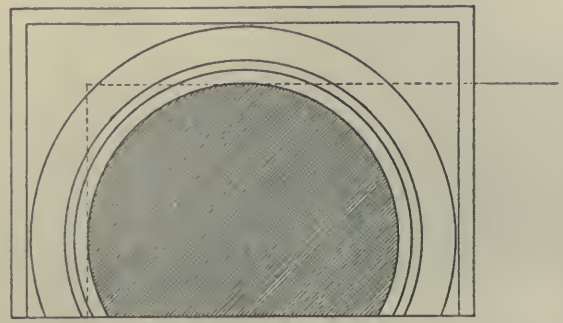
PLAT

TUSCAN ORDER

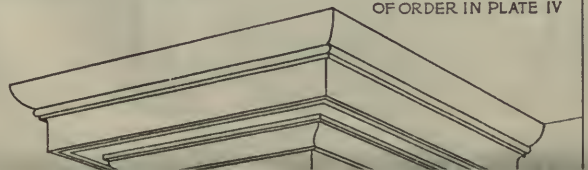


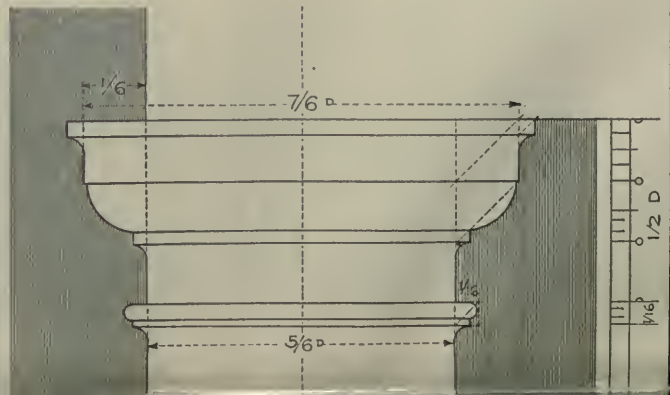


PLAN OF CAPITAL LOOKING UP

PERSPECTIVE VIEW

DRAWN TO THE SCALE OF ORDER IN PLATE IV





VIGNOLA

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THE TUSCAN ORDER—PLATES III AND IV

11. The distinguishing characteristic of the **Tuscan Order** is simplicity. Any forms of Pedestal, Column, and Entablature that show but few mouldings, and those plain, are considered to be Tuscan. Such are, in antiquity, those of the Temple of Piety in Rome, Fig. 51, and the lower order of the Amphitheater at Arles. Vignola's Tuscan Order, Fig. 52, is marked by the use of the Ovolo in the Cymatium, and by the frequent employment of the Congé. The height of the Column is seven Diameters and that of the Entablature accordingly seven-quarters, or a Diameter and three-quarters. The Base, Capital, Architrave, and Frieze are each half a Diameter high, and the Cornice three-quarters. But this measurement includes not only the Base itself, but the Cincture at the foot of the shaft. Dividing the Cornice into four parts, the Capital into three, and the Base into two, gives the principal horizontal divisions. The Bed Mould is a large Cyma Reversa. The Abacus is seven-sixths of a Diameter across, not including the Fillet at the top, and it projects its own height from the face of the Architrave above, which is in line with the Necking below.

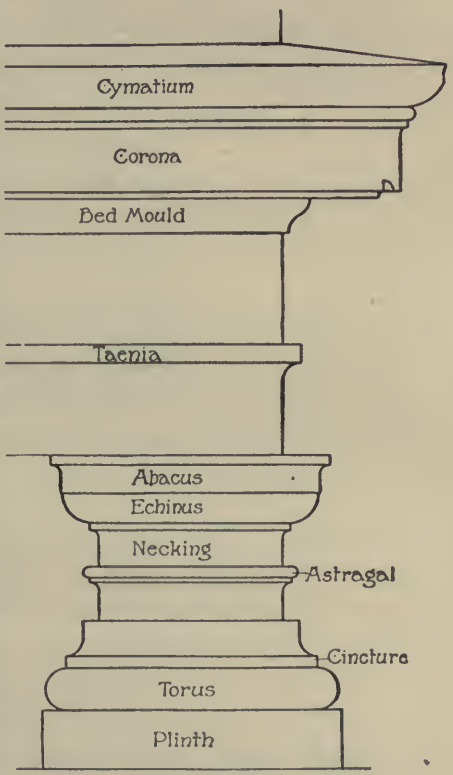


FIG. 52

All the principal dimensions can be expressed in terms of fourths and sixths of the lower Diameter of the Shaft.

Vignola makes the width of the Plinth a little greater than this, and sets the Bed Mould up one-twelfth, making the Frieze wider and the Corona narrower.

TABLE OF THE TUSCAN ORDER—PLATES III AND IV

$\frac{1}{4}$ *D* equals height of Plinth.

$\frac{3}{4}$ *D* equals { height of Cornice. / projection of Cornice.

$\frac{1}{6}$ *D* equals { height of Necking. / height of Echinus. / height of Abacus.

$\frac{1}{2}\ D = \frac{3}{6}$ *D* equals { height of Base, including Cincture. / height of Capital. / height of Architrave. / height of Frieze.

$\frac{5}{6}$ *D* equals upper Diameter of Shaft.

$\frac{6}{6}$ *D* equals lower Diameter of Shaft.

$\frac{7}{6}$ *D* equals width of Abacus.

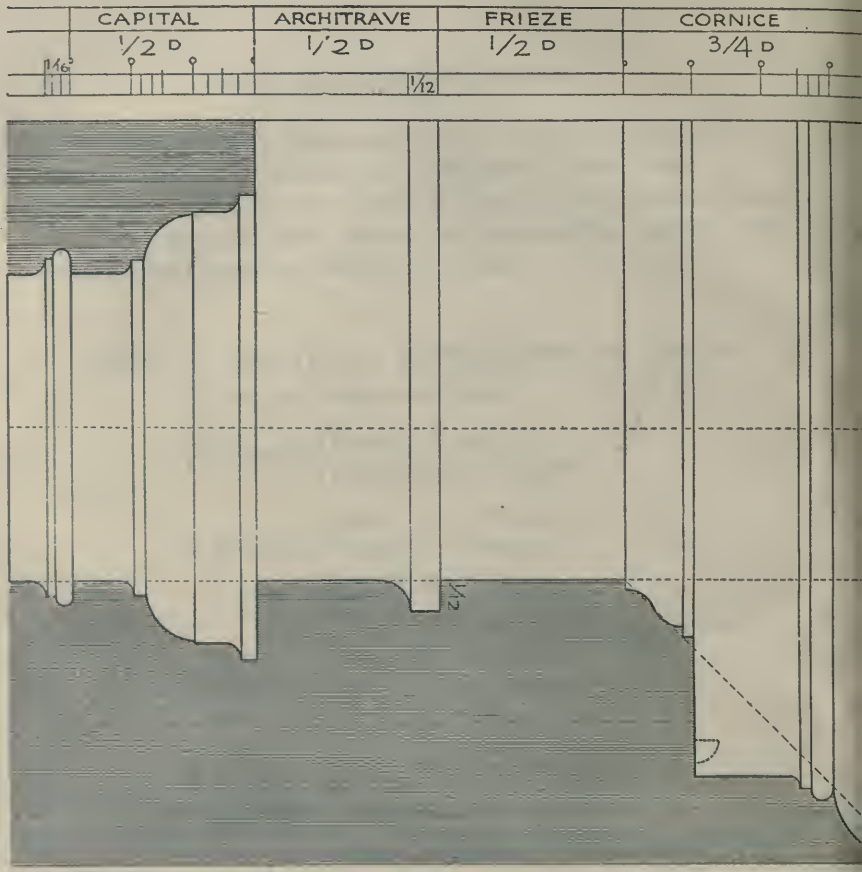
$\frac{8}{6}$ *D* equals width of Plinth.

$\frac{1}{12}$ *D* equals width of Tænia.

$\frac{1}{18}$ *D* equals { height of Astragal. / projection of Astragal.

THE DORIC ORDER—PLATES V, VI, AND VII

12. The distinguishing characteristics of the **Doric Order**, Figs. 53 and 54, are features in the Frieze and in the Bed Mould above it, called *Triglyphs* and *Mutules*, which are supposed to be derived from the ends of beams and rafters in a primitive wooden construction with large beams. Under each Triglyph, and beneath the Tænia that crowns the Architrave, is a little Fillet called the *Regula*. Under the



ELEVATION OF ENTABLATURE

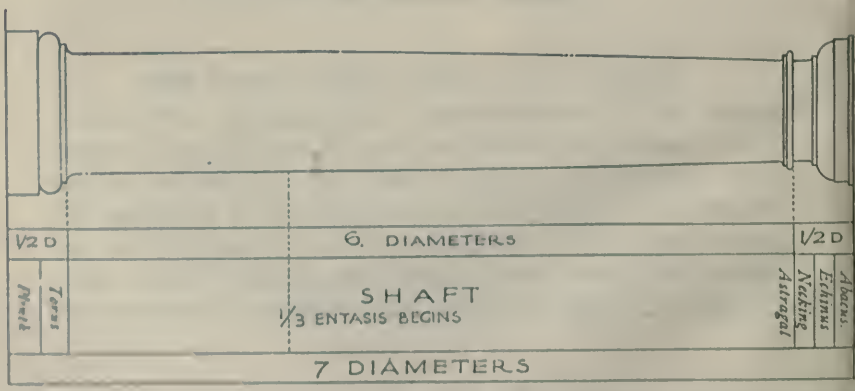


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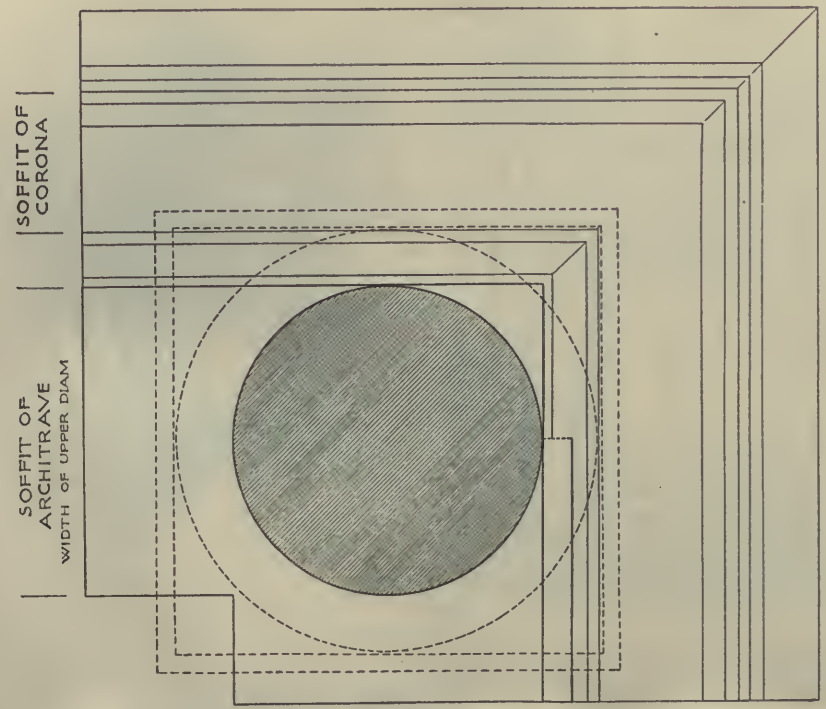
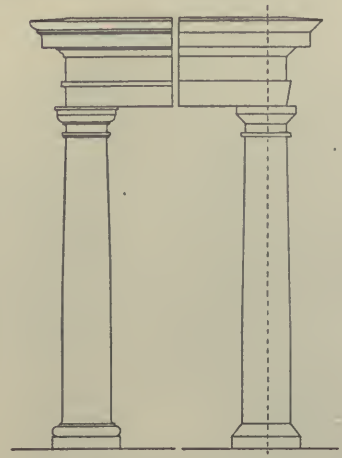
PLATE

TUSCAN ORDER

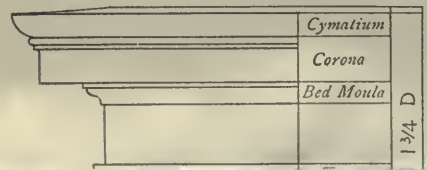


PLAN OF ENTABLATURE LOOKING UP



BLOCK ORDER

COMPLETE ORDER



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IGNOLA

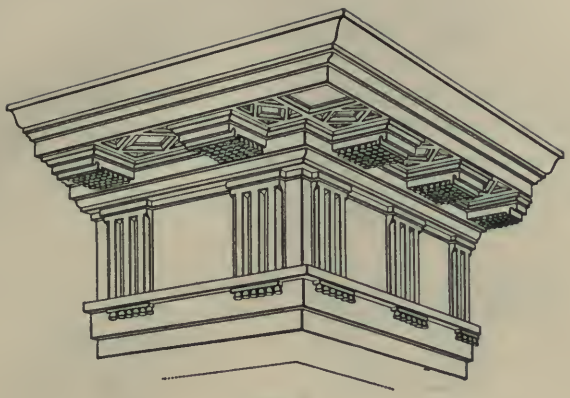


FIG. 53

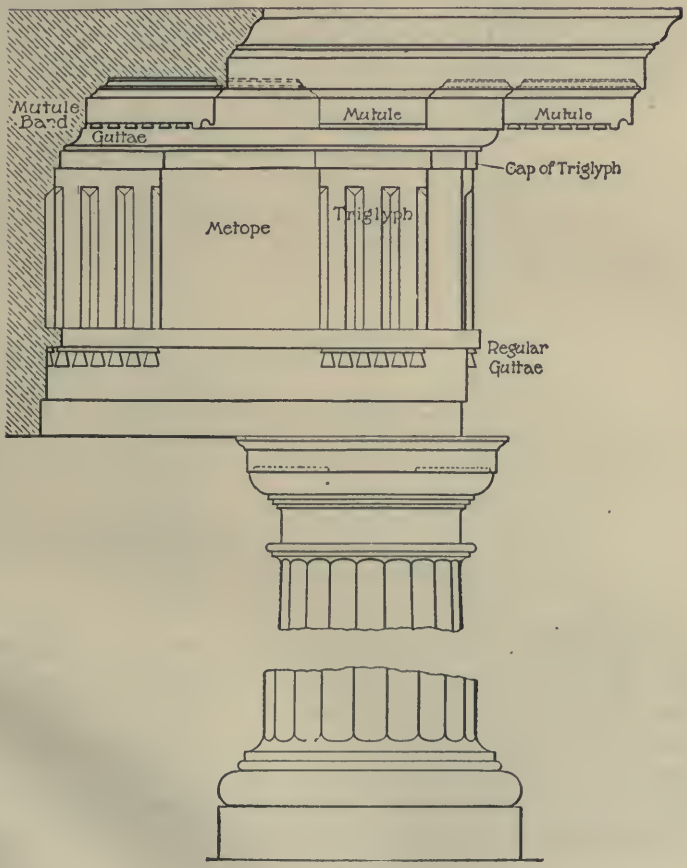
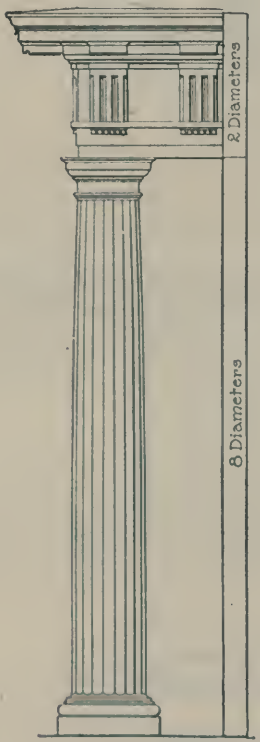

Mutule
Band
Guttae
Mutule
Mutule
Cap of Triglyph
Metope
Triglyph
Regular
Guttae

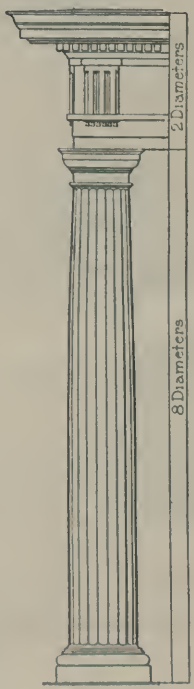
FIG. 54

Regula are six long drops, called *Guttæ*, which are sometimes conical, sometimes pyramidal. There are also either eighteen or thirty-six short cylindrical Guttæ under the soffit of each Mutule. The Guttæ are supposed to represent the heads of wooden pins, or treenails.



Mutulary Doric

FIG. 55



Denticulated Doric

FIG. 56

Two different Doric Orders are in use, the *Mutulary*, Figs. 53, 54, and 55, and the *Denticulated*, Figs. 56, 57, and 58. They differ chiefly in the cornices. In both of them the height, of three-quarters of a Diameter, is divided into four equal parts, the upper one embracing the gutter, or Cymatium, and the Fillet below, the next the Corona and the small Cyma Reversa, or Cymatium, above it. But the Bed Moulds

ELEVATION OF CAPITAL AND BASE

PLAN OF BASE

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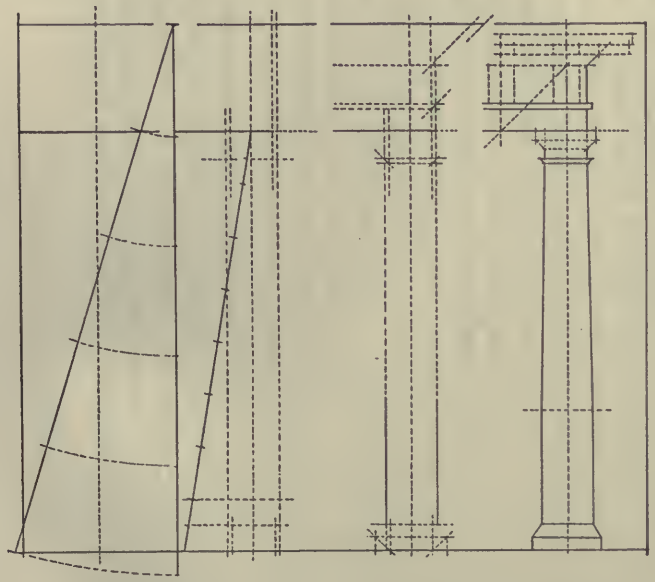
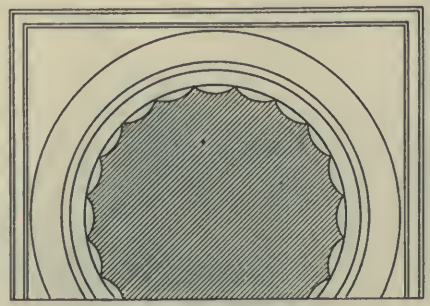
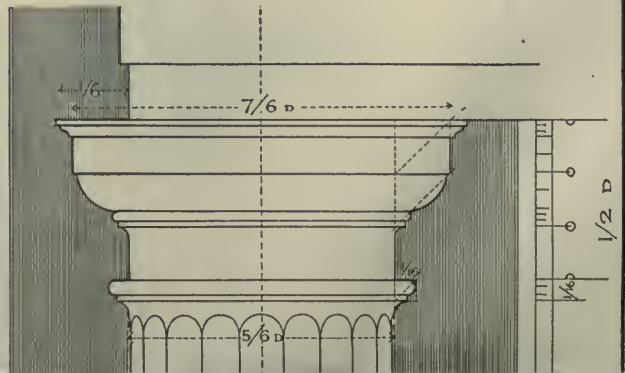
DORIC ORDER



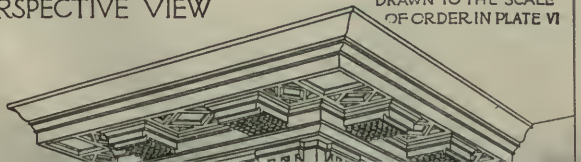


PLAN OF CAPITAL



PERSPECTIVE VIEW

DRAWN TO THE SCALE OF ORDER IN PLATE VI



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are unlike. In both of them, the lower member of the Bed Mould is a broad fillet, a sort of Upper Tænia, called the *Cap of the Triglyph*. This, unlike the Tænia below, breaks around the angles of the Triglyph, serving as a sort of crowning member, or cymatium, to both the Triglyph and the Metope.

13. In the **Mutulary Doric,** above the Cap of the Triglyph, is a narrow fillet that does not break around the angles and accordingly shows a broad soffit over the Metopes and at the corner of the building. These two fillets occupy the lower half of the lower quarter of the cornice. The upper half of the lower quarter, above this little fillet, is an Ovolo, and above this, the second quarter of the Cornice is occupied by a broad Fascia, called the *Mutule Band*, upon which are planted the Mutules, one over each Triglyph, which are half a Diameter wide, like the Triglyphs below them. They are broad, low, oblong brackets, crowned with a Fillet and Cyma Reversa, which also crown the Mutule Band between the brackets. On the soffit of each Mutule are thirty-six Guttæ and a drip moulding.

14. In the **Denticulated Doric,** Figs. 56, 57, and 58, the place of the Fillet and Ovolo above the Cap of the

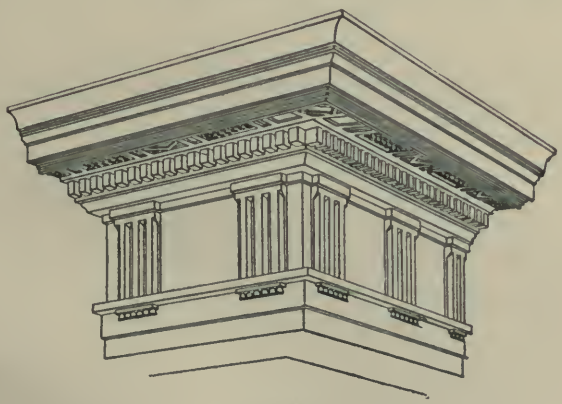


Fig. 57

Triglyph is taken by a large Cyma Reversa, the soffit of which is wider over the Metopes than over the Triglyphs, as

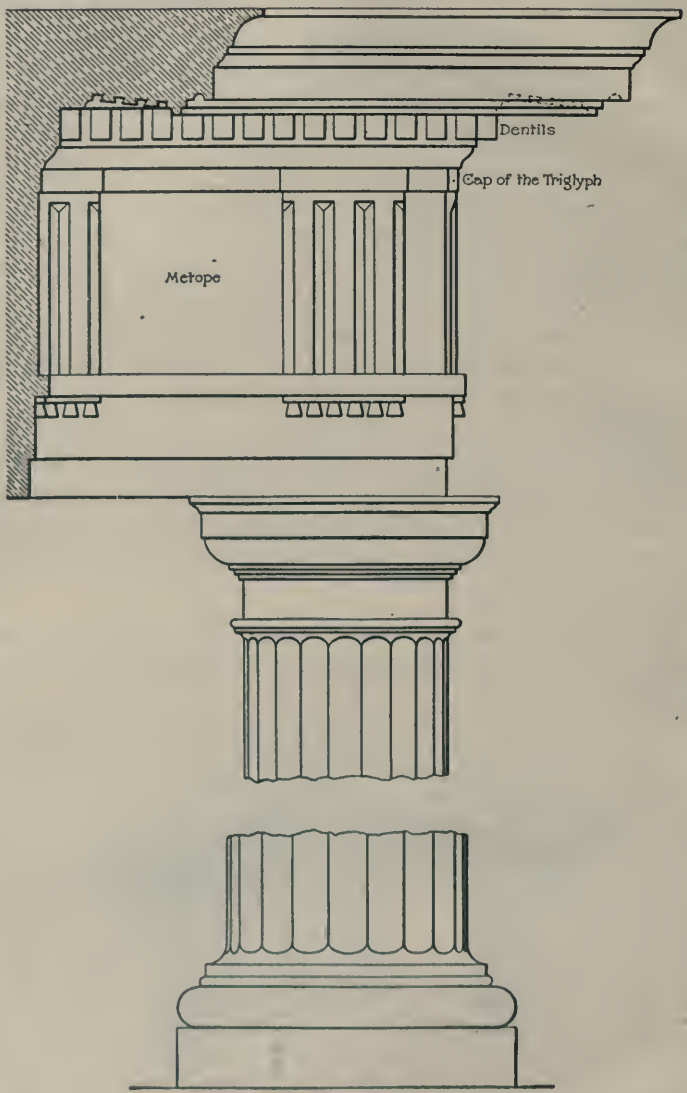


Fig. 58

is that of the small Fillet in the Mutulary. Above this moulding is a band like the Mutule Band, but instead of brackets, extending out under the Corona, it bears a row of small blocks, like teeth, called *Dentils*. These are one-eighth of a Diameter high, and are set one-eighth of a Diameter from center to center, or edge to edge. If this last dimension is divided into thirds, two of these go to the Dentil, and one to the space between it and the next one. This space is called an *Interdentil*, which is accordingly one twenty-fourth of a Diameter wide. The Dentil is thus one-eighth of a Diameter long and one-twelfth wide, or half a sixth, or of the proportions of two to three, like the Triglyph. The face of the last Dentil on the corner and the side of the first one around the corner come together in elevation without any Interdentil, giving the appearance of a *Double Dentil*, for the Dentils are square in plan and the side is just as wide as the face.

As the Triglyphs are a Diameter and a quarter on centers, or ten-eighths, there are ten Dentils to each Triglyph and Metope.

A Dentil comes just over the axis of each Column and there are three Dentils between the one over the corner Column and the Double Dentil on the corner, the farther edge of the third one being just over the face of the Frieze, or five-twelfths of a Diameter from the axis of the Column.

The last Dentil, or first half of the Double Dentil, is centered over the outer face of the bottom of the shaft, Fig. 92.

The Dentils constitute the upper member of the Bed Mould. They leave the chief part of the Corona unsupported, but the soffit of the Corona, which is slightly inclined, recalling the slope of the rafters, is not so wide as the soffit of the Mutulary Doric, owing to this encroachment of the Dentils. The Mutules, which are very shallow, have, accordingly, only eighteen Guttæ in place of thirty-six; that is, three rows, instead of six. There is also a Mutule over each Metope, as well as one over each Triglyph.

Vignola gives his Denticulated Doric a large Cavetto for a Cymatium, or gutter, instead of a Cyma Recta, and supports

the Echinus of the Capital by three fillets, instead of by a Fillet and Bead, Fig. 58.

The Triglyphs are three-quarters of a Diameter high and half a Diameter wide, Fig. 59. This width is divided into three parts, called *Shanks*. Each Shank, or *Femur*, is beveled on the edge nearly up to the top of the Triglyph, making in all two channels and two half channels. Each Shank is one-sixth of a Diameter wide and each beveled face a quarter of a sixth. The plain face of the Shank is, accordingly, one-twelfth, and just as wide as the channel. These are almost the only beveled faces to be found in the whole range of Classical Architecture, though beveled fillets are not uncommon. The two full channels are generally cut in at an angle of 45 degrees, but the two half channels on either side are shallower, and do not reach the face of the Frieze.

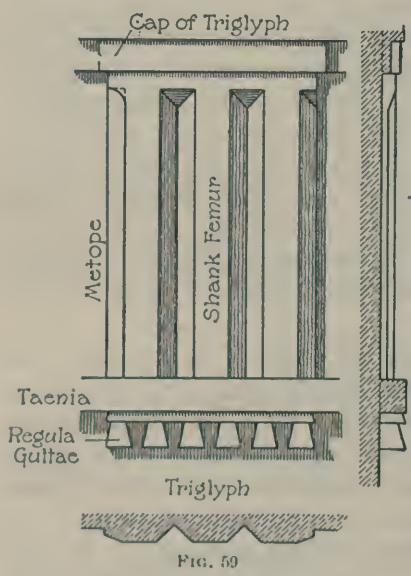
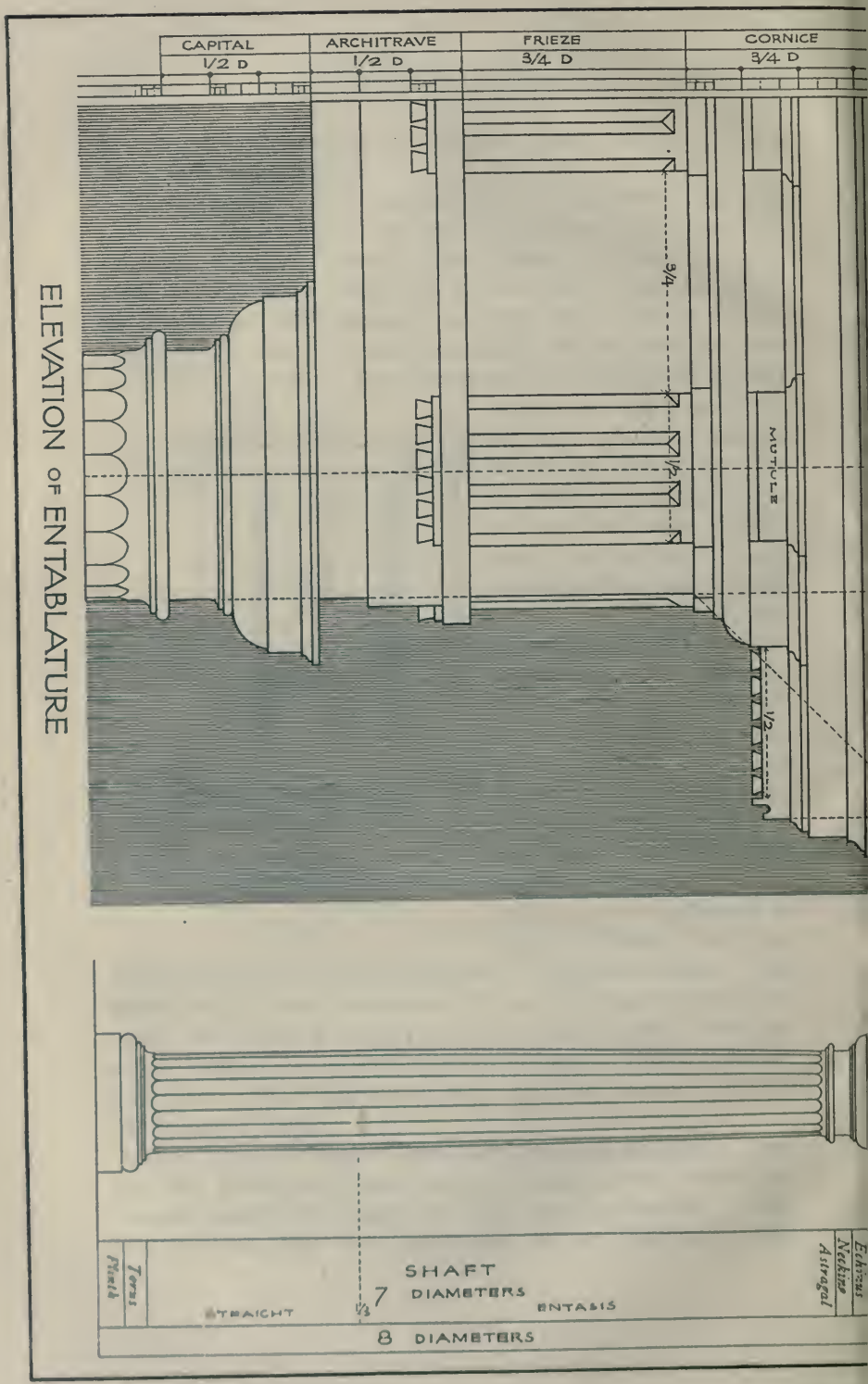


FIG. 59

The Triglyphs come just over the Columns. The portion of the Frieze between the Triglyphs is called a *Metope*. It is exactly square, being three-quarters of a Diameter wide. The fragment of a Metope between the last Triglyph and the corner of the Frieze is one-sixth of a Diameter wide. The face of the Metopes comes over the lower band of the Architrave, and that of the Triglyph projects slightly beyond the face of the upper Band.

The Column is eight Diameters in height, the Base, Capital, and Architrave each half a Diameter, the Frieze and Cornice each three-quarters. The total projection of the Cornice, including the Cymatium, is one Diameter. The



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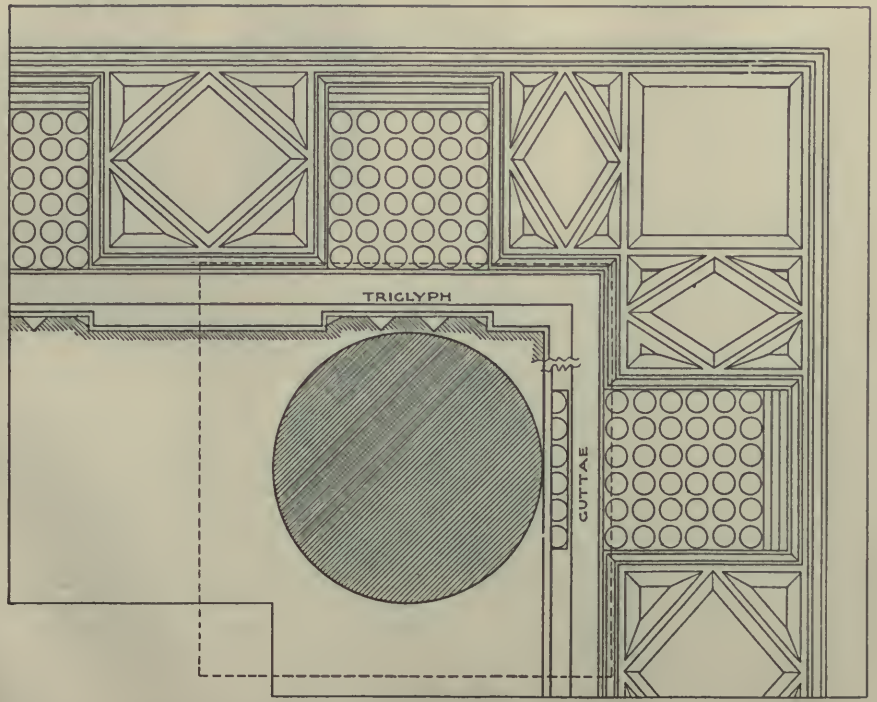
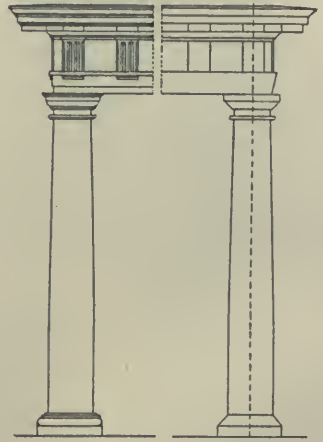
PLA

DORIC ORDER



PLAN OF ENTABLATURE LOOKING UP



BLOCK ORDER

COMPLETE ORDER

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Architrave is divided into two Bands, or Fascias. The lower one occupies the lower third of the Architrave, and the Tænia, Regula, and Guttæ the upper third. Half of this third goes to the Tænia, the projection of which equals its height.

The Doric Column has twenty *Channels*, each about one-sixth of a Diameter wide, which show in section, Fig. 60, an arc of 60 degrees. The solid edge that separates them, called the *Arris*, makes an angle of something over 90 degrees (102 degrees). The ten Arrises shown in elevation are easy to draw, as two come on the outline of the Shaft, two come on its "corners," and the two middle ones are almost exactly one-sixth of a Diameter apart. The channels are .157 of a Diameter wide, so that making the middle one one-sixth, or .166 of a Diameter, involves an error of only .009 of a Diameter, or about one-eighteenth of its width. The four other Arrises can then be put in without much dfficulty.

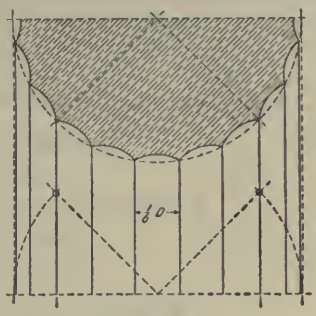
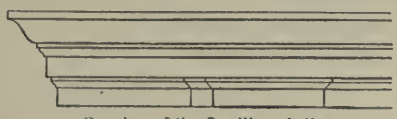


Fig. 60



Cornice of the Basilica Julia

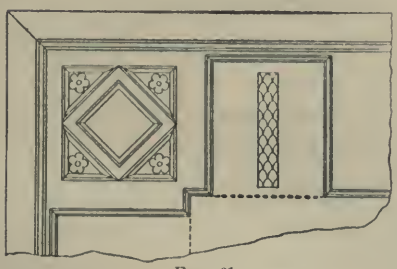


Fig. 61

15. The Doric Base and Capital, Figs. 54 and 58, are divided, like the Tuscan, into halves and thirds, but with additional mouldings, a bead being added above the Torus of the Base, and another below the Echinus of the Capital. The Abacus is crowned by a cymatium consisting of a Fillet and Cyma Reversa. If the height of the Capital is divided into thirds, the two upper thirds again into thirds, and the upper and lower of these

still again into three equal parts, all the horizontal lines of the Capital will be determined, as shown in Plate V.

Vignola's Denticulated Doric is imitated closely from the Doric Order of the Theater of Marcellus, and the Mutulary, which he has been thought to have invented, seems to have been derived from the Doric Order of the Basilica Julia, Fig. 61. There are no Roman Doric temples.

TABLE OF THE DORIC ORDER—PLATES V, VI, AND VII

$\frac{3}{4}$ *D* equals
- height of Frieze.
- height of Cornice.
- projection of Corona (Denticulated).
- projection of Mutule (Mutulary).
- width of Metope.

$\frac{1}{4}$ *D* equals height of Plinth.

$\frac{1}{6}$ *D* equals
- projection of Plinth.
- projection of Abacus.
- height of Abacus.
- height of Necking.
- height of Echinus and Bead.
- height of Lower Band.
- height of Guttæ, Regula, and Tænia.
- width of Shank.
- width of Corner Metope.

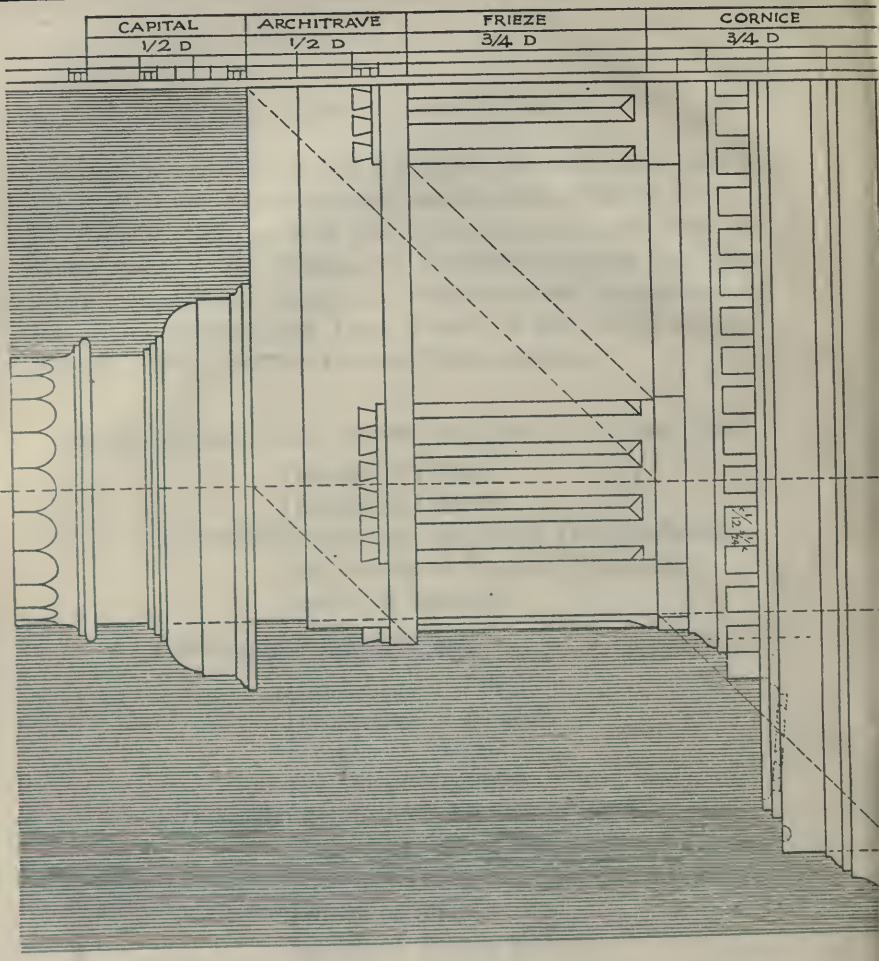
$\frac{1}{3}$ *D* = $\frac{2}{3}$ *D* equals
- height of Base, including the Cincture.
- height of Capital.
- height of Architrave.
- width of Triglyph.

$\frac{1}{8}$ *D* equals height of Dentils.

$\frac{1}{12}$ *D* equals
- width of Dentils.
- height of Tænia.
- projection of Tænia.

$\frac{1}{16}$ *D* equals
- height of Astragal.
- projection of Astragal.

$\frac{1}{32}$ *D* equals width of Interdentils.



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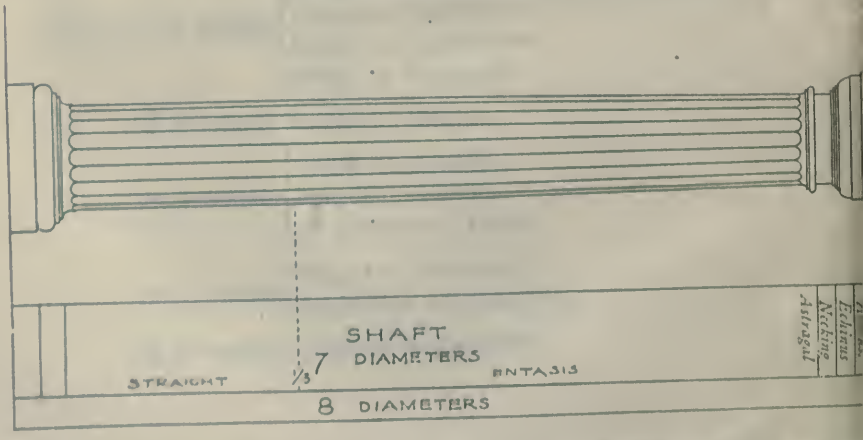

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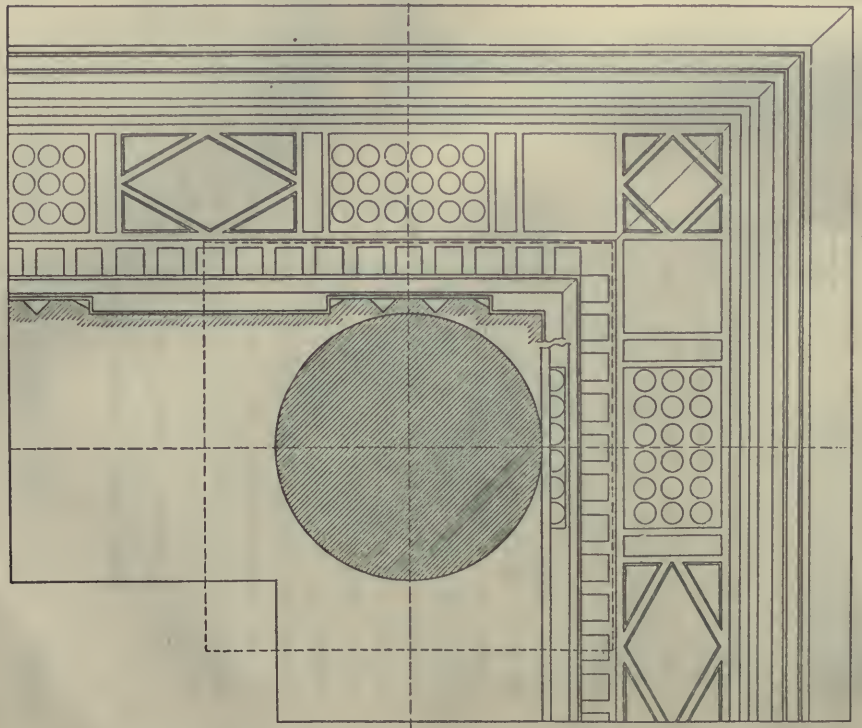
PLAT

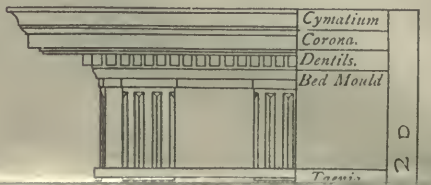
DORIC ORDER [DENTICULATED]



PLAN OF ENTABLATURE LOOKING UP

PERSPECTIVE VIEW

COMPLETE ORDER



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THE IONIC ORDER—PLATES VIII AND IX

16. The prototypes of the **Ionic Order** are to be found in Persia, Assyria, Fig. 62, and Asia Minor. Like the Doric Order, it seems to have originated in a wooden construction. It is characterized by Bands in the Architrave and Dentils in the Bed Mould, both of which are held to represent sticks laid together to form a beam or a roof. But the most conspicuous and distinctive feature is the *Scrolls* that decorate the Capital of the Column. These have no structural significance, and are purely decorative forms derived from Assyria and Egypt. Originally the Ionic Order had no Frieze and no Echinus in the Capital. These were borrowed from the Doric Order, and, in like manner, the Dentils and Bands in the Doric were imitated from the Ionic. The Ionic Frieze was introduced in order

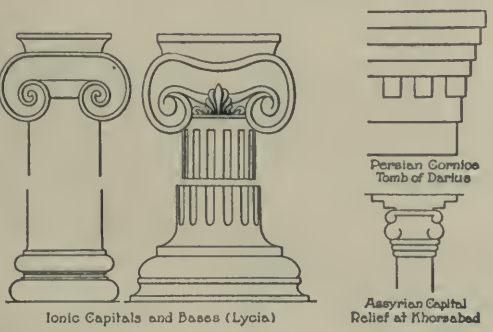

FIG. 62

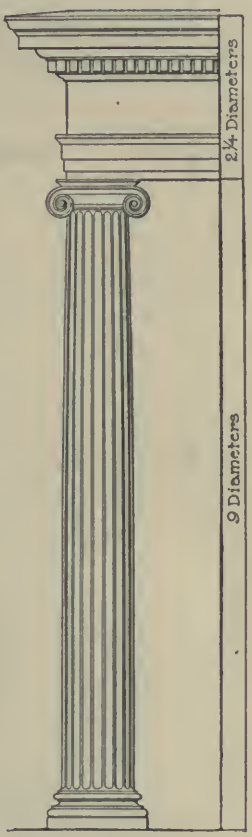

FIG. 63

to afford a place for sculpture, and was called by the Greeks the *Zoöphorus*, or Figure Bearer, Fig. 64.

In the Ionic Entablature, the Architrave, Frieze, and Cornice are of about the same height, each measuring

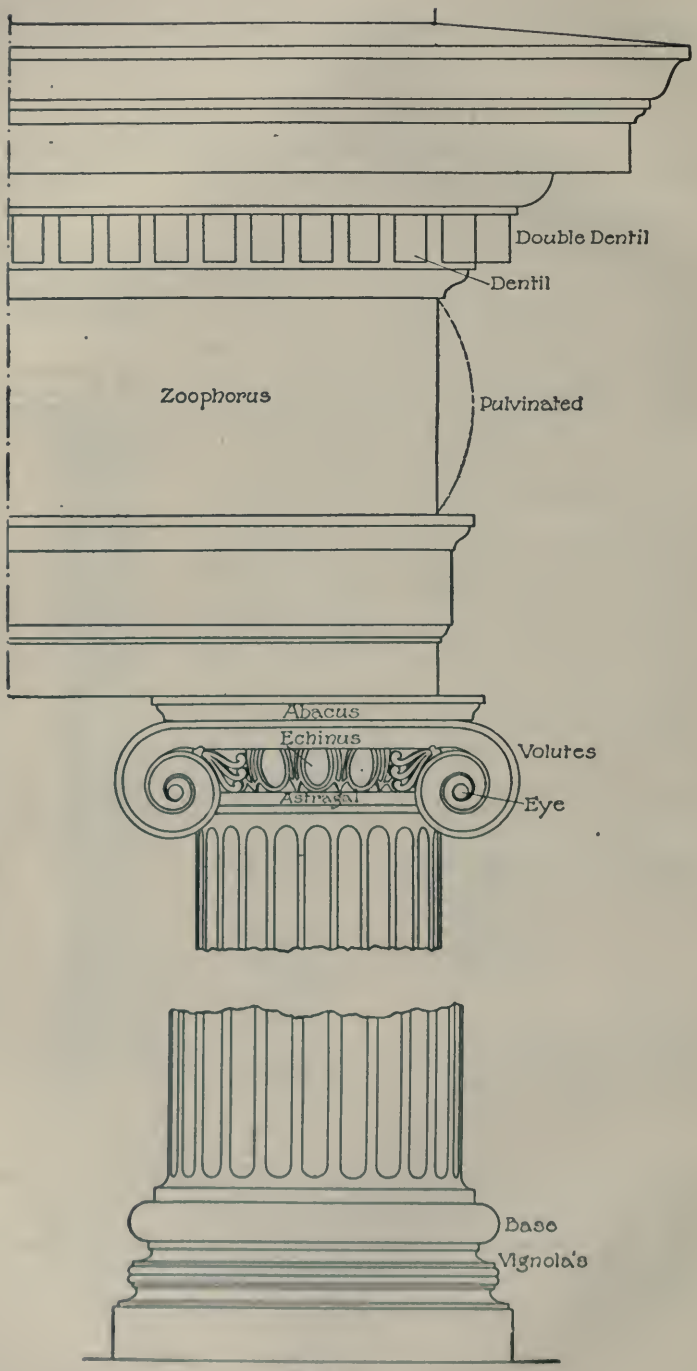
Double Dentil
Dentil
Zoophorus
Pulvinated
Abacus
Echinus
Volutes
Astragal
Eye
Base
Vignola's

Fig. 64

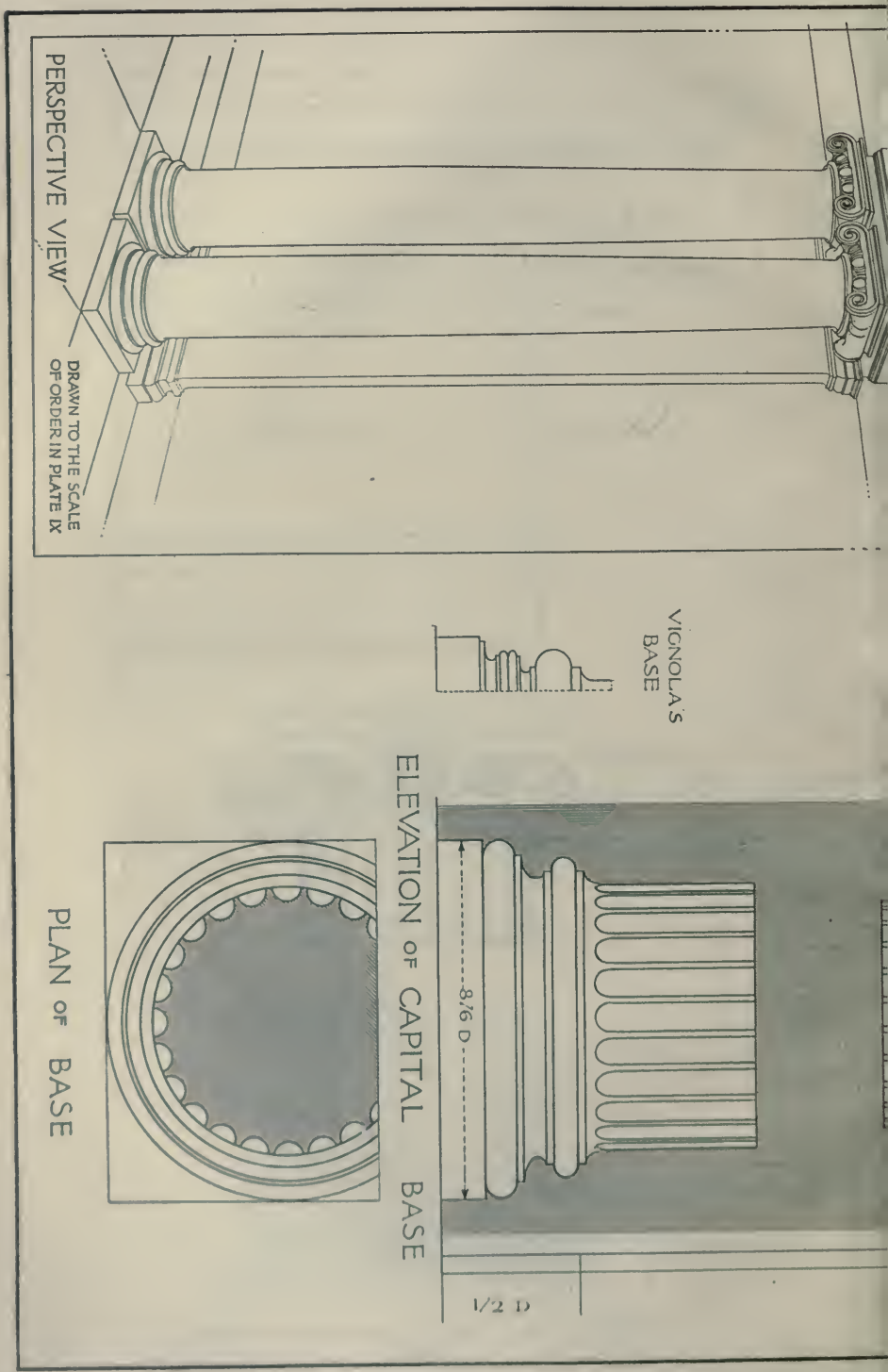

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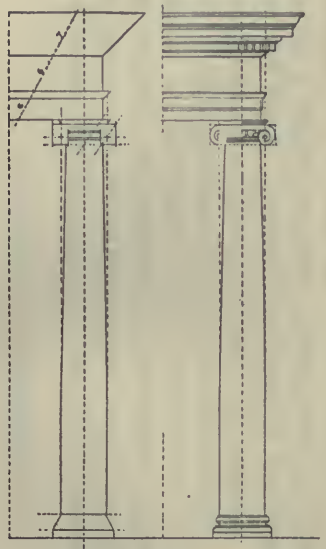
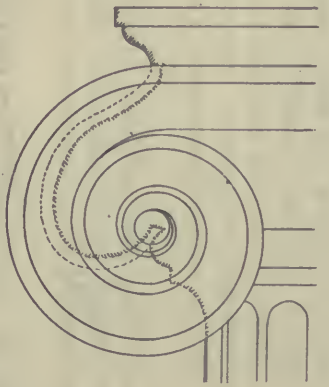
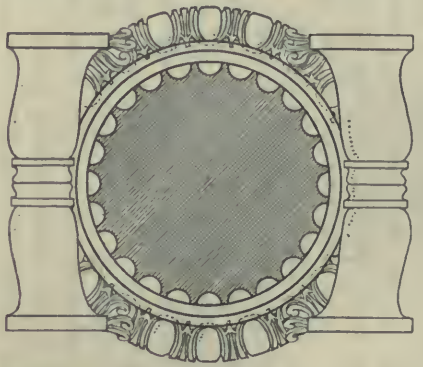
PLATE

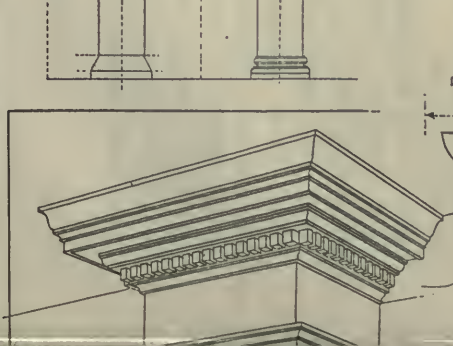
IONIC ORDER

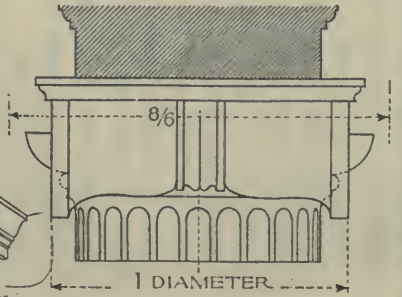


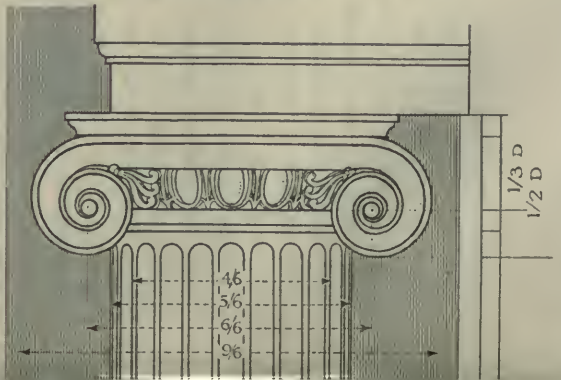


PLAN OF CAPITAL









VIGNOLA

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about three-quarters of a Diameter. But Vignola makes the Architrave a little smaller and the Cornice a little larger, so that they measure, respectively, five-eighths, six-eighths, and seven-eighths of a Diameter. The Architrave is divided into five parts, each an eighth of a Diameter in height. The upper one is occupied by a large Cyma Reversa and Fillet, which take the place of the Doric Tænia. Below are two fascias, or bands, of equal height, each measuring a quarter of a Diameter. The lower one is crowned by an Ovolo and Fillet. The French often use three bands, as in the Corinthian Architrave.

The Ionic Frieze is plain, except for the sculpture upon it. It sometimes has a curved outline, as if ready to be carved, and is then said to be *Pulvinated*, from *Pulvinar*, a bolster, which it much resembles.

The Cornice is much like that of the Denticulated Doric, which was derived from it, but has no Mutules. The upper half, as in the Doric, is taken up by the Cymatium and Corona, and the lower half by the Bed Mould. This is divided into four equal parts, of which the upper one is given to an Ovolo, the lower to a Cyma Reversa and Fillet, and the two middle ones to a Dentil Band and Fillet. Upon this band are planted the Dentils, which are one-sixth of a Diameter high, and are set one-sixth on centers, or on edges, instead of one-eighth, as in the Denticulated Doric. Two-thirds of this sixth go to the width of the Dentil and one to the space between, or Interdentil. The Dentil is, accordingly, one-ninth of a Diameter wide, and the Interdentil one-eighteenth, instead of a twelfth and a twenty-fourth. A Dentil is put on the axis of a column, and an Interdentil comes just over the outer line of the Frieze. There is, apparently, a Double Dentil on the corner, the outer face of which is two-thirds of a Diameter, or four-sixths, from the axis of the column. The first half of it, as in the Denticulated Doric, comes over the outer face of the lower end of the shaft, Fig. 93. There are two Dentils between the one over the column and the Double Dentil, in place of three, as in the Doric.

The Ionic Capital, like the Doric, has an Echinus and an Abacus crowned by a Cyma Reversa and Fillet. But generally it has no Necking, and it is, accordingly, only two-sixths of a Diameter in height, or one-third instead of one-half. Both the Echinus and the Cymatium that crown the

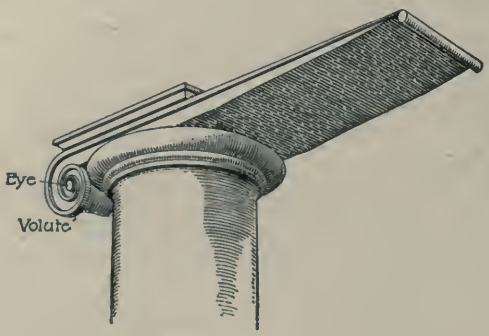


Fig. 65

Abacus are larger than in the Doric, and the face of the Abacus smaller, and the Echinus projects in front of the Abacus, instead of being covered by it. The Abacus and its Fillet extend beyond the Echinus on either side, and are curled up into the Scrolls, or *Volutes*, Fig. 65, the whole height of

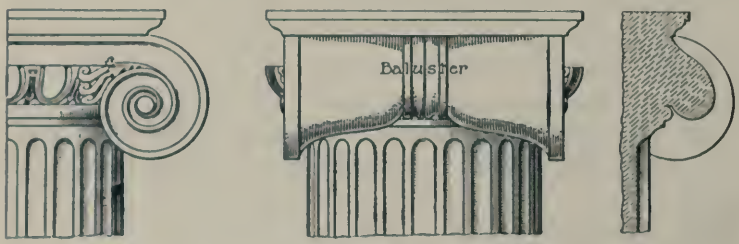


Fig. 66

which is a half Diameter, measuring down from the Architrave. The *Eyes* of the Scrolls are one-third of a Diameter from the top, on the line separating the bottom of the Capital from the top of the Astragal that crowns the Shaft. They are just one Diameter apart on centers, coming over the

outer lines of the lower end of the Shaft, and the inner edges of the Scrolls are two-thirds apart. The Echinus is generally carved with Eggs and Darts, three of which show between the Scrolls, the next one on either side being hidden by sprigs of Honeysuckle Ornament. These Scrolls, Fig. 66, show on the sides a series of mouldings called the *Baluster*, or *Bolster*. The term Abacus is generally held to apply only to the Cyma Reversa and Fillet, above the Scrolls.

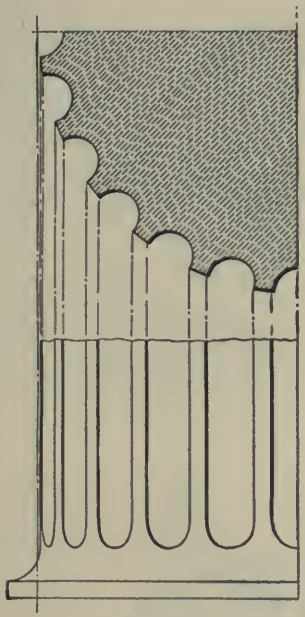


Fig. 67

The Shaft of the column is ornamented with twenty-four *Flutings*, Fig. 67, semicircular in section, which are separated not by an Arris, but by a Fillet of about one-fourth their width. This makes the Flutings only about two-thirds as wide as the Doric Channels, or about one-ninth of a Diameter, instead of one-sixth. Four-fifths of one-twenty-fourth of the circumference is .106 of a Diameter, while one-ninth of the diameter is .111, a difference of less than a twentieth.

The typical Ionic base is considered to consist mainly of a Scotia, as in some Greek examples, Fig. 69. It is common,

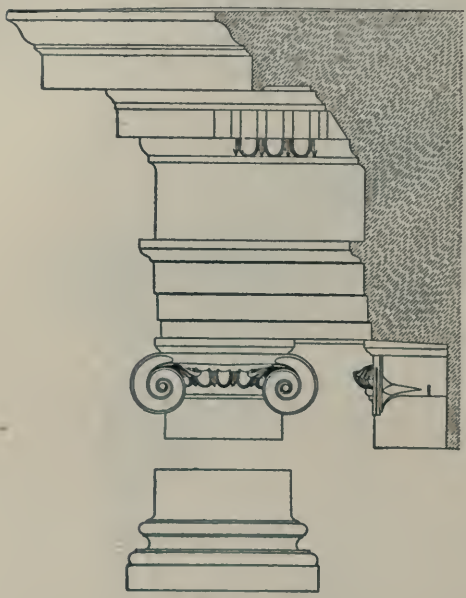
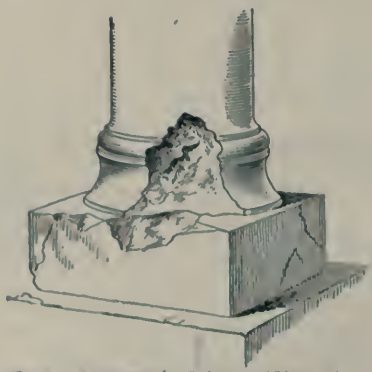


FIG. 68



Base of Choragic Column (Athens)

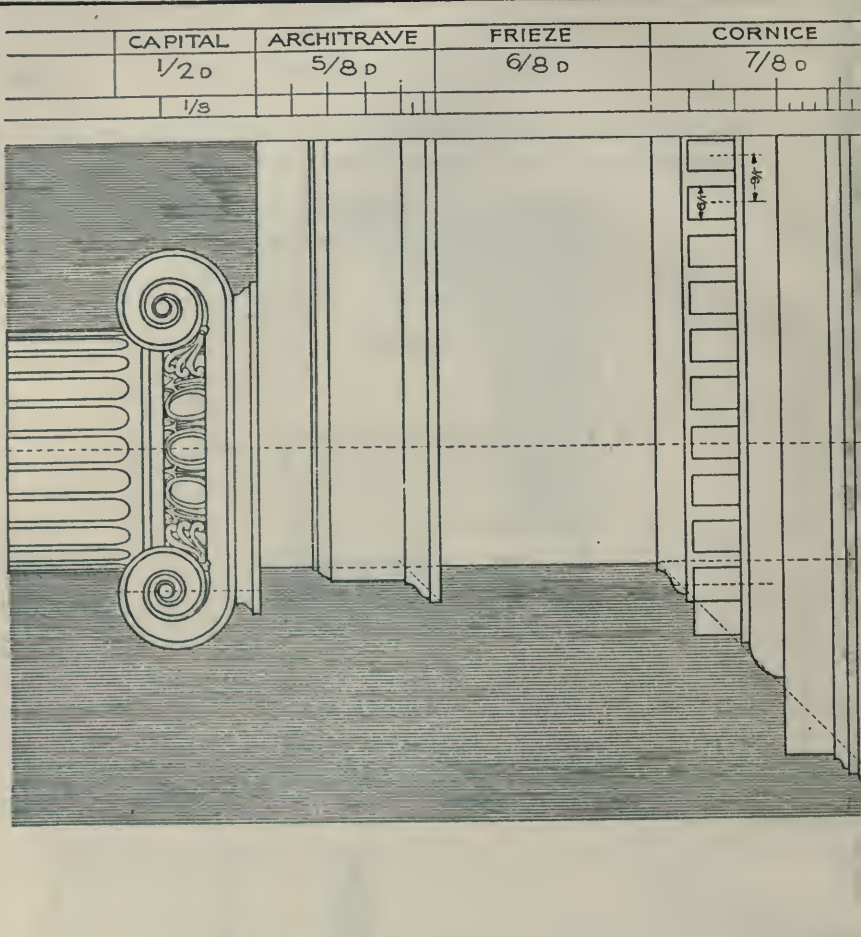
FIG. 69

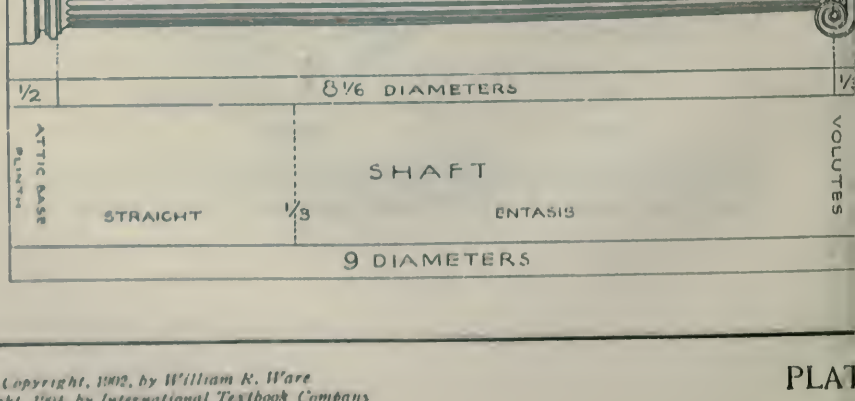
Attic Base

FIG. 70

however, to use instead what is called the *Attic Base*, Fig. 70, consisting of a Scotia and two Fillets between two large

ELEVATION OF ENTABLATURE





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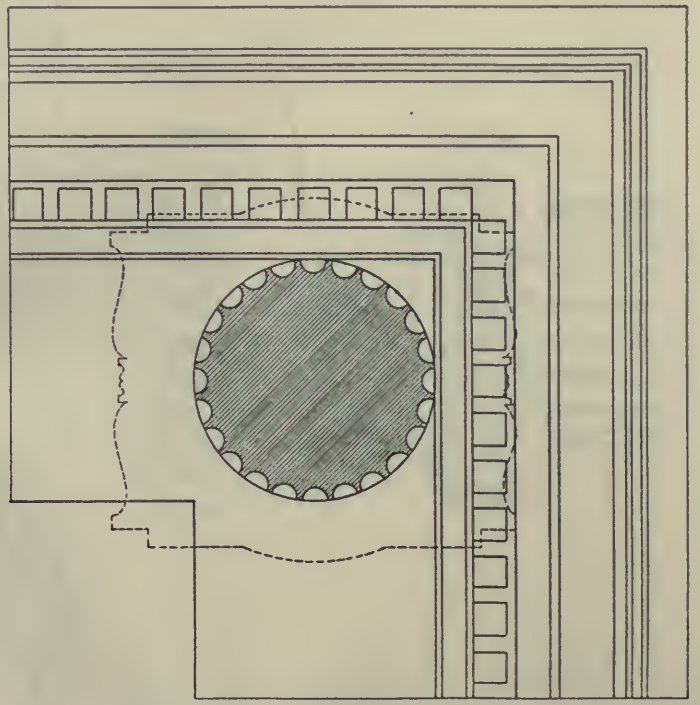
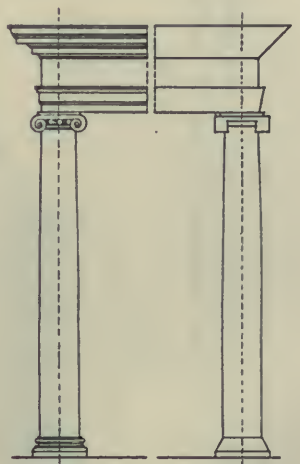
PLAT

IONIC ORDER

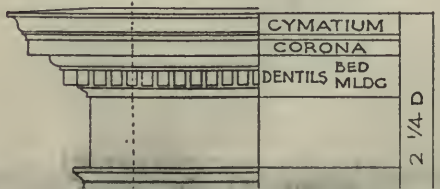


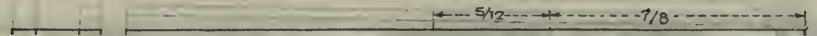
PLAN OF ENTABLATURE LOOKING UP



BLOCK ORDER

COMPLETE ORDER





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X

КОЛЕС СКЛЕЯ

Toruses, mounted on a plinth, the whole half a Diameter high. The Plinth occupies the lower third, or one-sixth of a Diameter. Vignola adopted for his Ionic Order a

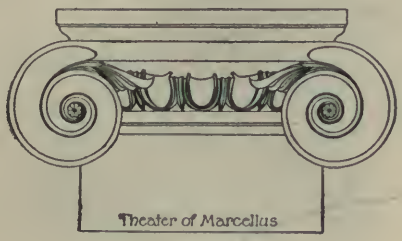


FIG. 71

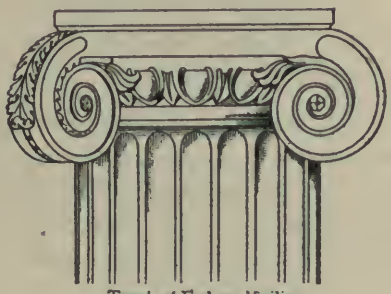


FIG. 72

FIG. 73

modification of the Attic Base, substituting for the single large Scotia two small ones, separated by one or two Beads and Fillets and omitting the lower Torus, Fig. 64.

The principal ancient examples of the Ionic Order in Rome are those of the Theater of Marcellus, Fig. 71, and of the Temple of Fortuna Virilis, Fig. 72.

The Ionic Capital sometimes has a necking like the Doric, which is then generally decorated, Fig. 73. Sometimes, also, the four faces of the Capital are made alike, double scrolls occurring at the corners, where they project at an

Scamozzi Capital

FIG. 74

angle of 45 degrees. In this case there is no Baluster, and the Capital resembles the upper portion of a Composite Capital. It is then sometimes called the Roman Ionic Capital, or the Scamozzi Capital, Fig. 74, from the name of the architect Scamozzi, who frequently employed it.

Almost all the dimensions of the Ionic Order can be expressed in terms of sixths of a Diameter, as appears in the following Table:

TABLE OF THE IONIC ORDER—PLATES VIII AND IX

$\frac{5}{6}$ D equals height of Architrave.

$\frac{4}{4}$ D = $\frac{6}{6}$ D equals height of Frieze.

$\frac{7}{6}$ D equals { height of Cornice. / projection of Cornice.

$\frac{1}{4}$ D = $\frac{2}{6}$ D equals height of each Band.

$\frac{1}{6}$ D equals { projection of Plinth. / height of Plinth. / height of Dentils. / distance of Dentils, o. c. / projection of Abacus.

$\frac{1}{3}\ D = \frac{2}{6}\ D$ equals height of Capital.

$\frac{1}{2}\ D = \frac{3}{6}\ D$ equals { height of Base. / height of Scrolls.

$\frac{2}{3}\ D = \frac{4}{6}\ D$ equals { distance between Scrolls. / distance from Axis to outer face of Double Dentil.

$\frac{5}{6}\ D$ equals upper Diameter.

$1\ D = \frac{6}{6}\ D$ equals { lower Diameter. / distance of Eyes of Scrolls, o. c. / length of Baluster.

$\frac{7}{6}\ D$ equals width of Abacus.

$1\frac{1}{3}\ D = \frac{8}{6}\ D$ equals { width of Plinth. / width of Echinus (minus).

$1\frac{1}{2}\ D = \frac{9}{6}\ D$ equals width of Scrolls (minus).

$\frac{1}{6}\ D$ equals { width of Dentil. / width of Fluting.

$\frac{1}{12}\ D$ equals { height of Astragal. / projection of Astragal.

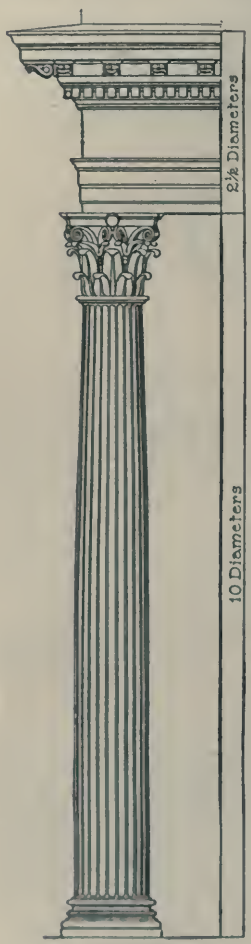
$\frac{1}{18} D$ equals width of Interdentil.

THE CORINTHIAN ORDER—PLATES X AND XI

17. The three distinguishing characteristics of the **Corinthian Order**, Fig. 75, are a tall bell-shaped Capital, a series of small brackets, called *Modillions*, that support the Cornice instead of Mutules, in addition to the Dentils, and a general richness of detail, which is enhanced by the use of the *Acanthus leaf*, Fig. 76, in both Capitals and Modillions.

The height of the Cornice, Fig. 77, is divided into five parts. The two lower and the two upper parts resemble the lower and upper halves of the Ionic Cornice. The middle fifth is occupied by a *Modillion Band*, which carries the Modillions, or brackets. These, as well as the Modillion

Band, are crowned by a small Cyma Reversa. They consist of a double scroll, below which is an Acanthus leaf. Each Modillion is half a Diameter long, one-fifth high, and as wide as a Dentil and two Interdentils; that is to say, two-ninths of a Diameter. They are set two-thirds of a Diameter on centers, one being over the axis of the corner Column, and one over the outer face of the Double Dentil. The soffit of the Corona between the Modillions is occupied by a sinkage with mouldings, called a *Caisson*, in the middle of which there is a large *Rosette*.



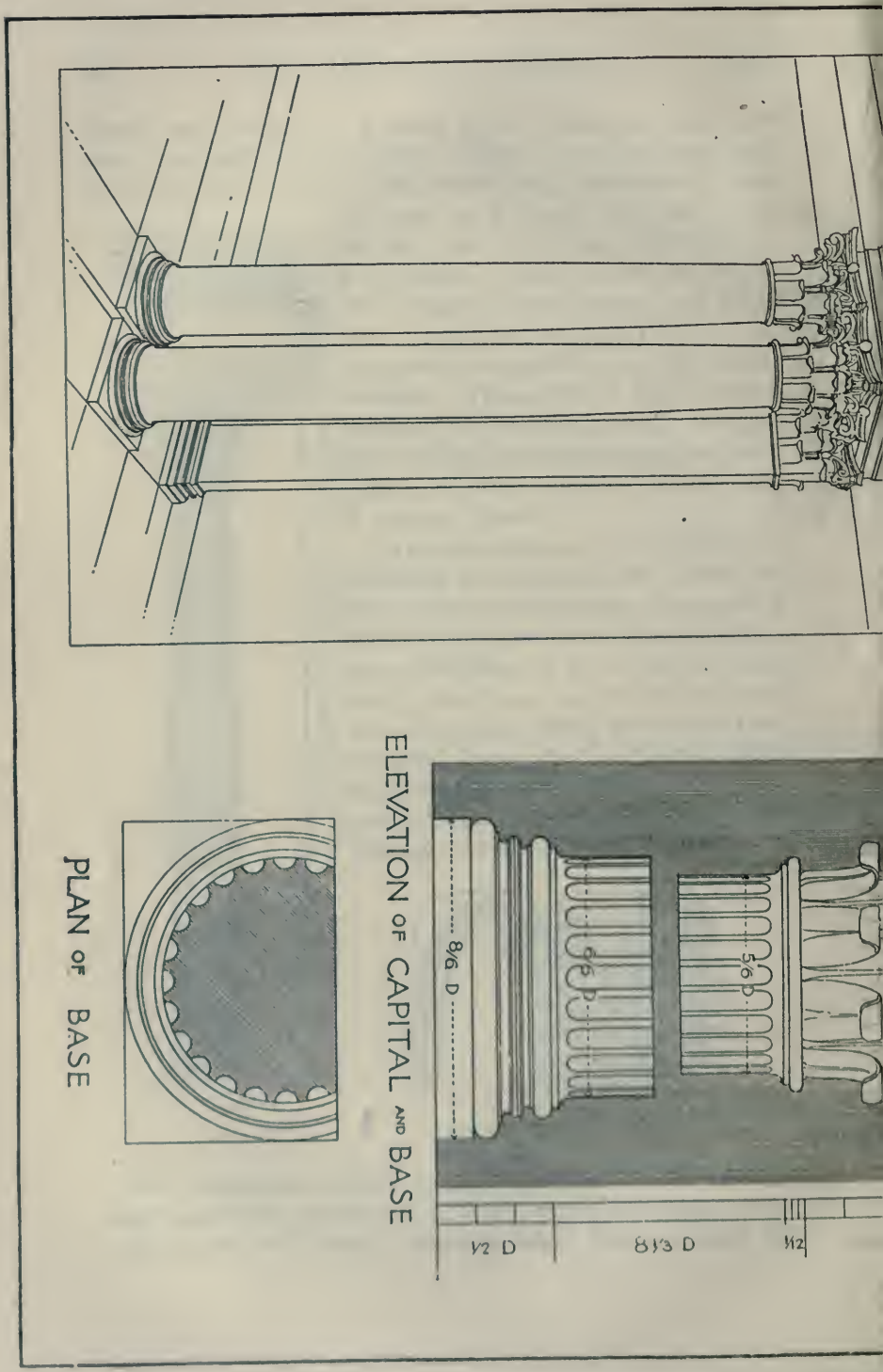
Corinthian

Fig. 75

As the Modillions are two-thirds of a Diameter on centers, or four-sixths, and the Dentils are one-sixth, on centers, it follows that there are four Dentils to each Modillion; i. e., a Dentil under every Modillion, and three between. As in the Ionic Order and in the Denticulated Doric, the last Dentil, which is the first half of the Double Dentil, is centered over the face of the lower Diameter of the column, Fig. 94.

Fig. 76

The Architrave, which is three-quarters of a Diameter high, has three Bands and a large cymatium, which is as wide as the first Band. The two lower Bands occupy the



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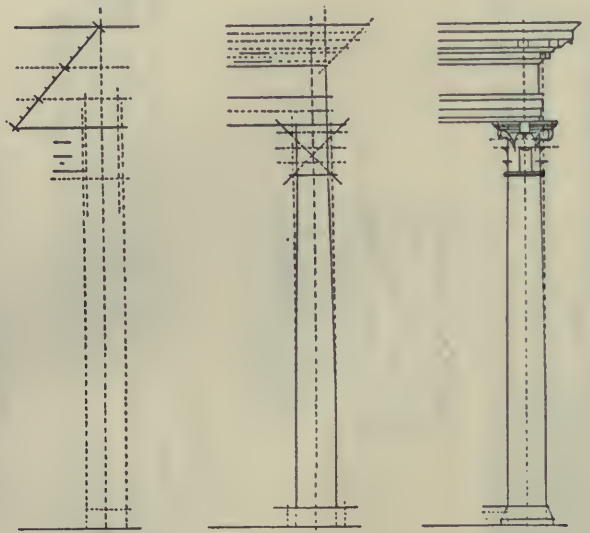
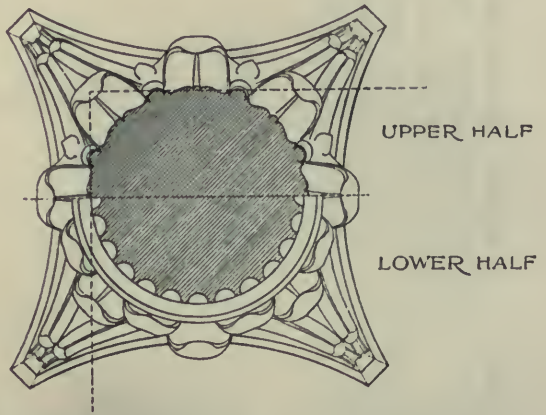
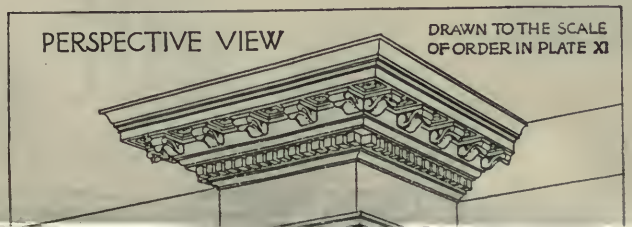
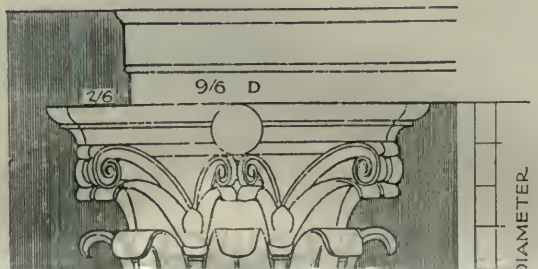
CORINTHIAN ORDER





PLAN OF CAPITAL LOOKING UP





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CORINTHIAN ORDER

lower half of the Architrave, and the third Band and the cymatium the upper. A small Bead, or a small Cyma Reversa, generally crowns each Band. The Frieze, which is also three-quarters of a Diameter high, may be plain, pulvinated, or sculptured.

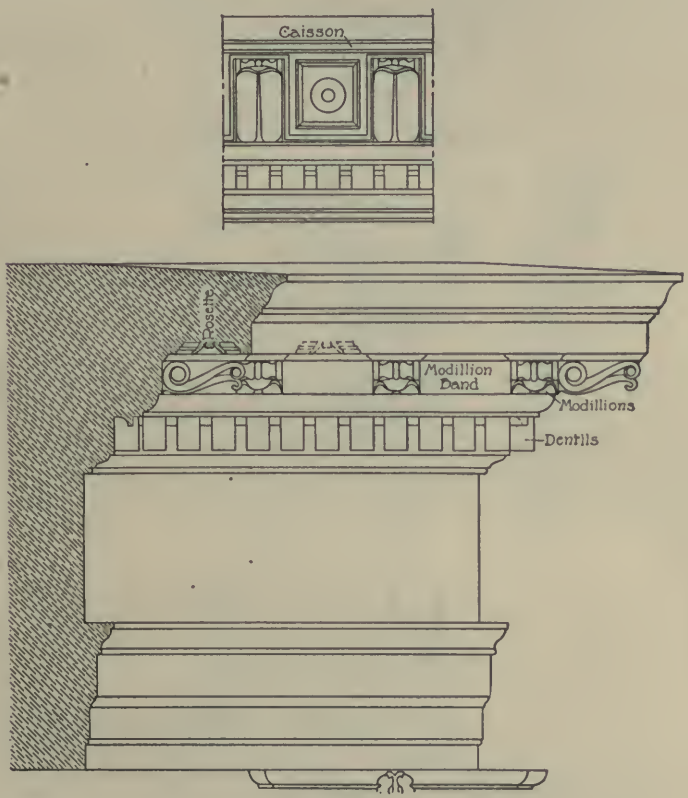


Fig. 77

The Capital, Fig. 78, is seven-sixths of a Diameter high, the upper sixth being taken up by the Abacus, which is nine-sixths, or a Diameter and a half, in width, though it does not look so. It is moulded on the edge with an Ovolo and Fillet above a large Congé and small Fascia. The corners are cut off at an angle of 45 degrees, and the sides hollowed

out in a curve of 60 degrees. The width across from curve to curve is seven-sixths of a Diameter. Each face of the Abacus bears a flower, called the *Fleuron*, that springs from a small bud above the middle leaf.

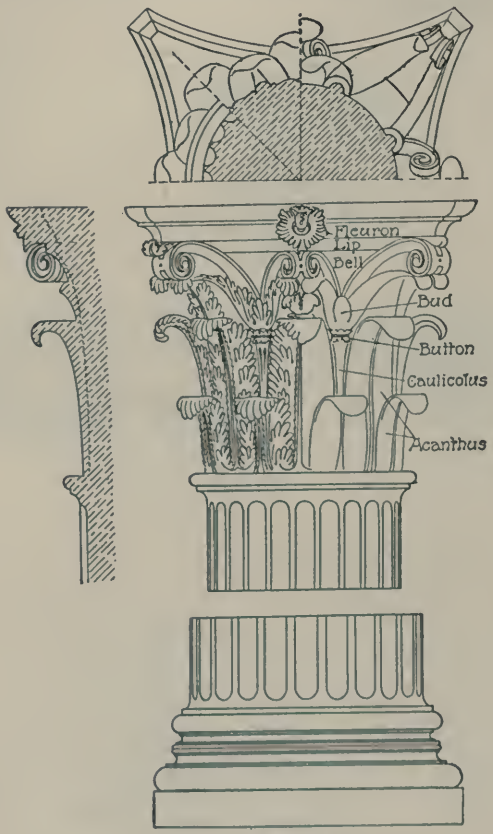
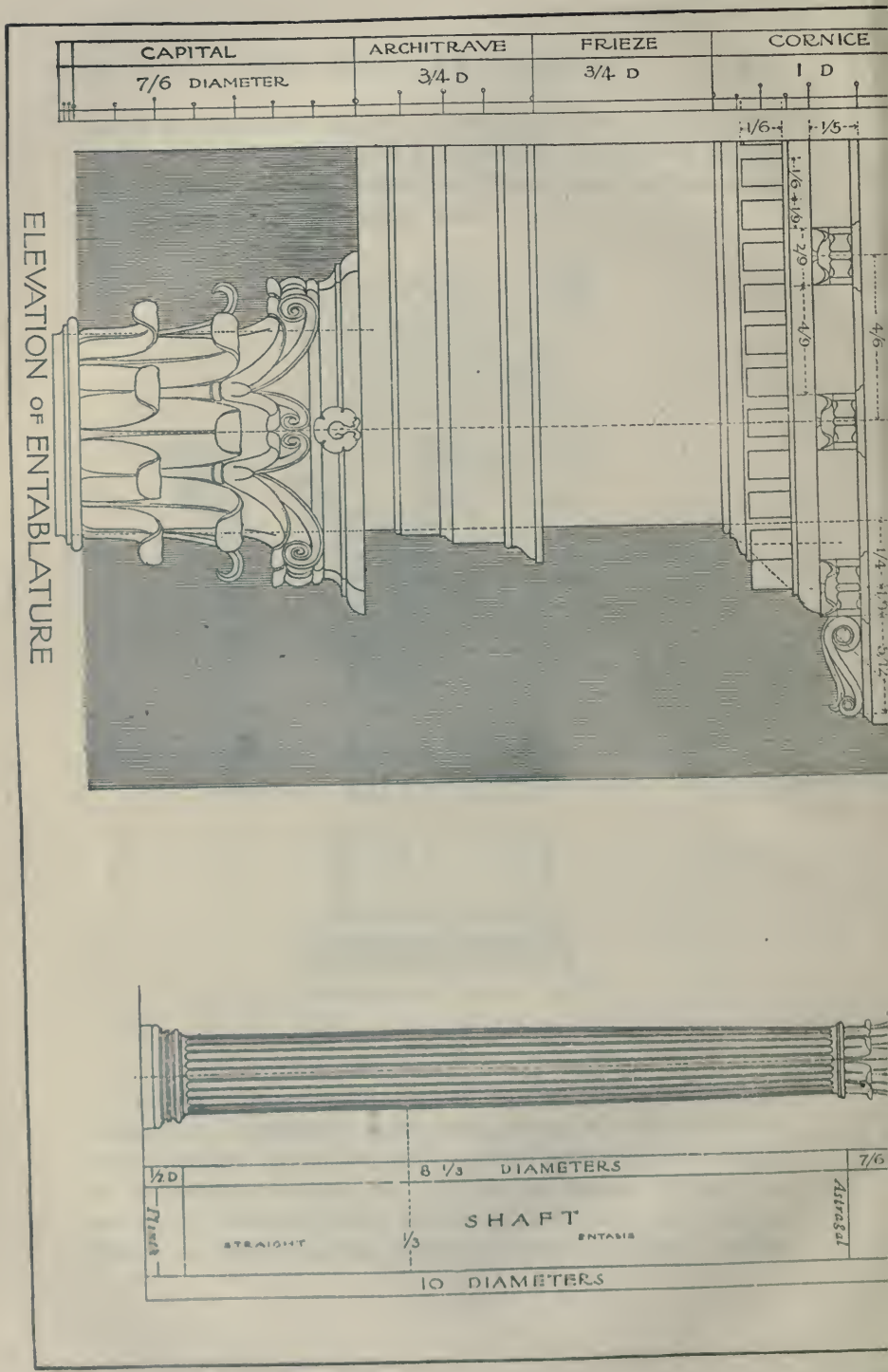


Fig. 78

The *Bell* of the capital, Fig. 79, is one Diameter high, or six-sixths; it terminates under the Abacus in a Beak Moulding called the *Lip of the Bell*, which measures seven-sixths of a Diameter across, its greatest projection coming just under the least projection of the upper line of the Abacus. The lower two-sixths are covered by a row of eight Acanthus



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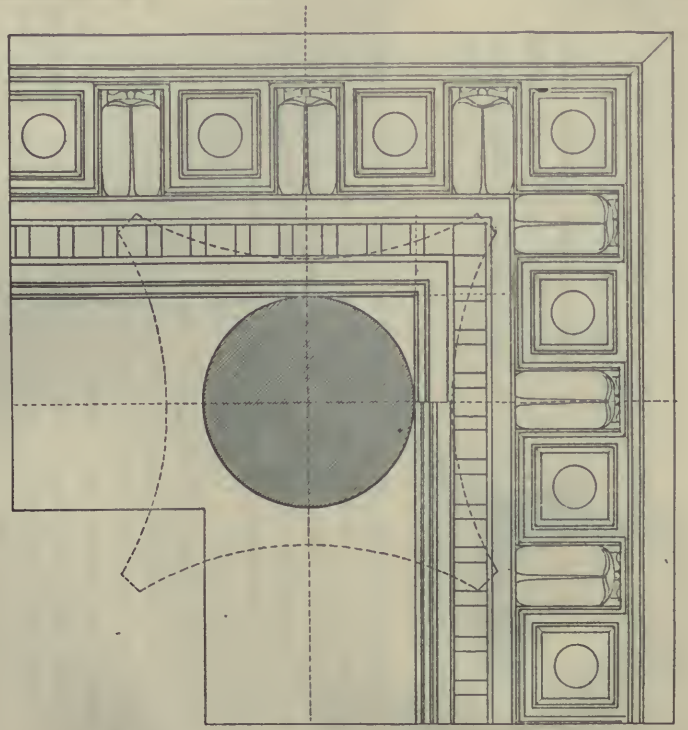
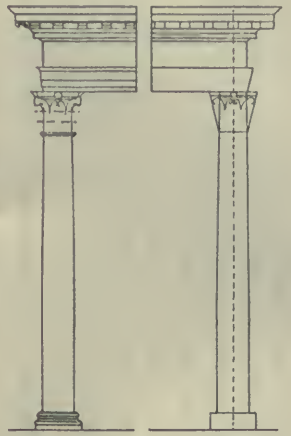
CORINTHIAN ORDER

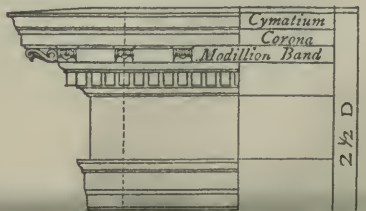


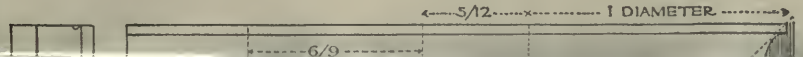
PLAN OF ENTABLATURE LOOKING UP



BLOCK ORDER

COMPLETE ORDER





VIGNOLA

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leaves, which bend down at the top to the extent of half a sixth, or a quarter of their own height. The next two-sixths show a similar row of eight leaves, set alternately with those below, four facing the sides of the Capital, and four the corners. Like those of the first row, they spring from the Astragal at the top of the Shaft, and the mid-rib of each leaf shows between two lower leaves, it being really four-sixths high. These also bend down half a sixth. Between the eight leaves of the second row are eight *Caulicoli*, or cabbage stalks, which terminate in a *Button*, upon which rests a sort of *Bud*, which divides into two leaves. These turn right and left, the larger one toward the corner of the Capital, the smaller toward the side or front under the

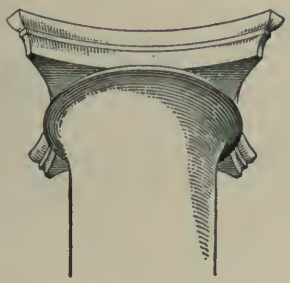
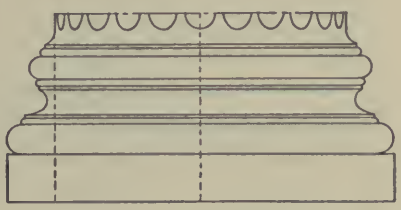


FIG. 79



Palladio's Corinthian Base

FIG. 80

Fleuron. From each Bud rise also two scrolls, or Volutes, one of which runs out to support the projecting corner of the Abacus. The other, which is smaller and does not rise higher than the Lip of the Bell, supports the Fleuron. Sixteen leaves of a third row curl over under these sixteen volutes, making with them eight masses of ornament, one on each corner of the column, and one in the middle of each side. These give in plan an eight-pointed star, each point consisting of a large leaf, two small leaves, two Volutes, and above them, either the Fleuron or the horn of the Abacus. Between them is seen the Bell of the Cap, with its Lip.

Here, again, the Attic Base is commonly used, but sometimes, especially in large columns, a base is used that resembles Vignola's Ionic Base, with two Beads between the

Scotias, except that it has a lower Torus, Fig. 78. Palladio used a very elegant variety of Attic Base, enriched by the addition of Beads and Fillets, Fig. 80. The Shaft is fluted like the Ionic shaft, with twenty-four semicircular flutings, but these are sometimes filled with a convex moulding, or *Cable*, to a third of their height, Fig. 75.

Almost all the buildings erected by the Romans employ the Corinthian Order.

TABLE OF THE CORINTHIAN ORDER—PLATES X AND XI

$\frac{3}{4}$ *D* equals { height of Architrave. / height of Frieze.

1 *D* = $\frac{4}{4}$ *D* equals { height of Cornice. / projection of Cornice.

$\frac{1}{6}$ *D* equals { projection of Plinth. / height of Plinth. / height of Lower Band. / height of Dentils. / distance of Dentils, o. c.

$\frac{1}{3}$ *D* = $\frac{2}{6}$ *D* equals { height of Leaves. / projection of Abacus.

$\frac{1}{2}$ *D* = $\frac{3}{6}$ *D* equals length of Modillions.

$\frac{2}{3}$ *D* = $\frac{4}{6}$ *D* equals { distance of Modillions, o. c. / distance from Axis to face of Double Dentil.

$\frac{5}{6}$ *D* equals upper Diameter.

1 *D* = $\frac{6}{6}$ *D* equals { lower Diameter. / height of Bell. / height of Cornice. / projection of Cornice.

$\frac{7}{6}$ *D* equals { height of Capital. / width of Abacus (least). / width of Lip of the Bell.

$1\frac{1}{3}\ D = \frac{8}{6}\ D$ equals width of Plinth.

$1\frac{1}{2}\ D = \frac{9}{6}\ D$ equals width of Abacus (greatest).

$2\ D = \frac{12}{6}\ D$ equals width of Abacus (diagonal).

$\frac{1}{9}\ D$ equals width of Dentil.

$\frac{2}{9}\ D$ equals width of Modillion.

$\frac{1}{18}\ D$ equals width of Interdentil.

$\frac{1}{12}\ D$ equals { height of Astragal. / projection of Astragal.

$\frac{1}{6}\ D$ equals height of Modillion.

THE COMPOSITE ORDER—PLATES XII AND XIII

18. The **Composite Order,** Fig. 81, is a heavier Corinthian, just as the Tuscan is a simplified Doric. The chief proportions are the same as in the Corinthian Order, but the details are fewer and larger. It owes its name to the Capital, Fig. 82, in which the two lower rows of leaves and the Caulicoli are the same as in the Corinthian. But the Caulicoli carry only a stunted leaf-bud, and the upper row of leaves and the sixteen Volutes are replaced by the large Scrolls, Echinus, and Astragal of a complete Ionic Capital, with four faces like Scamozzi's. A Composite Capital thus has two Astragals, if the lower be included, but this properly belongs to the shaft. The Scrolls are nearly half a Diameter high, covering up half the Abacus and coming down so as to touch the second row of Acanthus leaves. They measure fully nine-sixths across, and are only three-sixths apart, or half a Diameter, instead of four-sixths, as in the Ionic.

Vignola's Composite Entablature, Fig. 82, differs from his Ionic chiefly in the shape and size of the Dentils. They are larger, and are more nearly square in elevation, being a fifth of a Diameter high, and one-sixth wide, the Interdentil being one-twelfth, and they are set one-fourth of a Diameter apart, on centers. The last Dentil, or first half of the Double Dentil, is centered over the outer face of the Column, at the

bottom, as in the Corinthian, Ionic, and Denticulated Doric, Fig. 95. The outer face of the Double Dentil is three-quarters of a Diameter from the axis of the Column, and

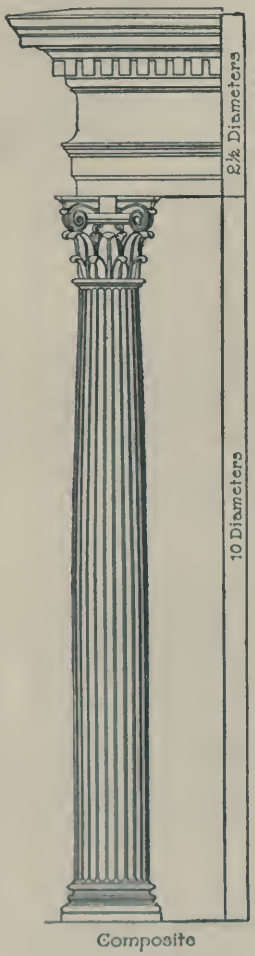


Fig. 81

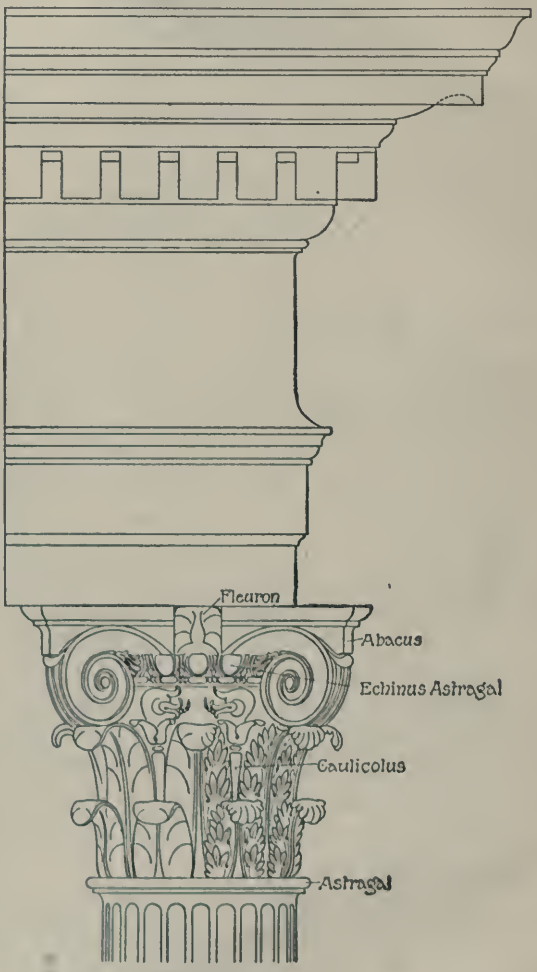
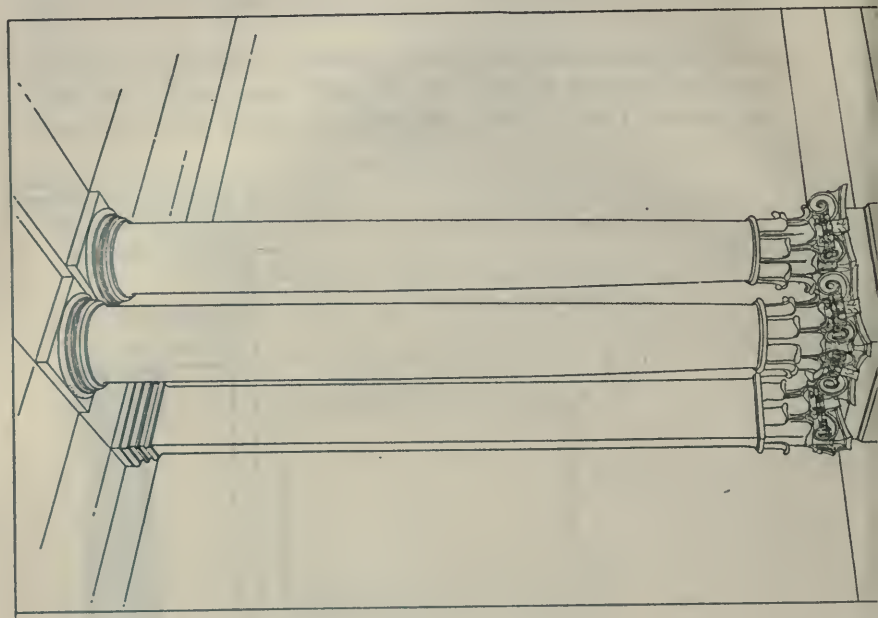
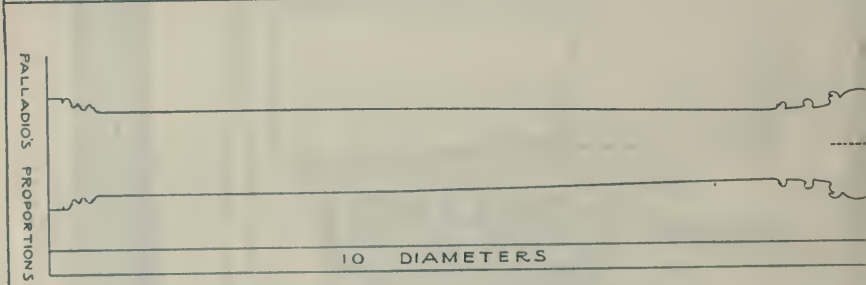
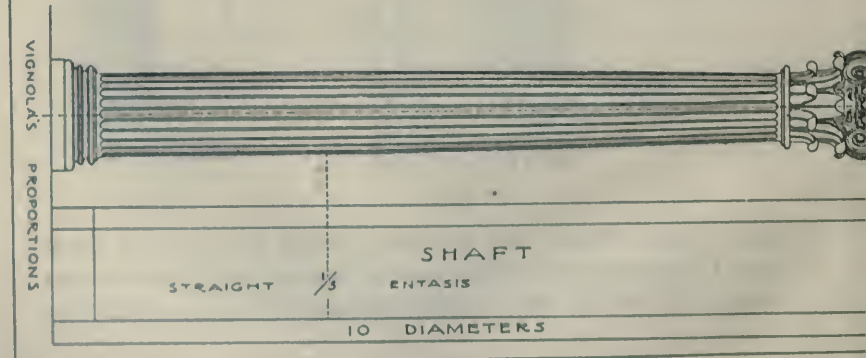


Fig. 82

there is only one Dentil between the Double Dentil and the one over the axis, against two in the Corinthian and Ionic, and three in the Denticulated Doric. The Frieze terminates







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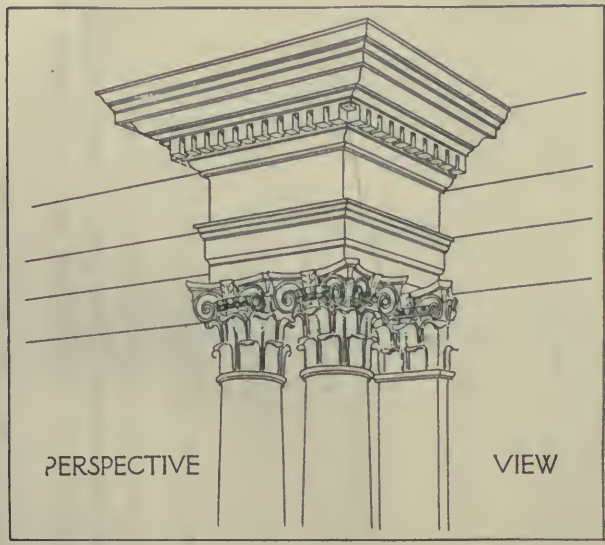
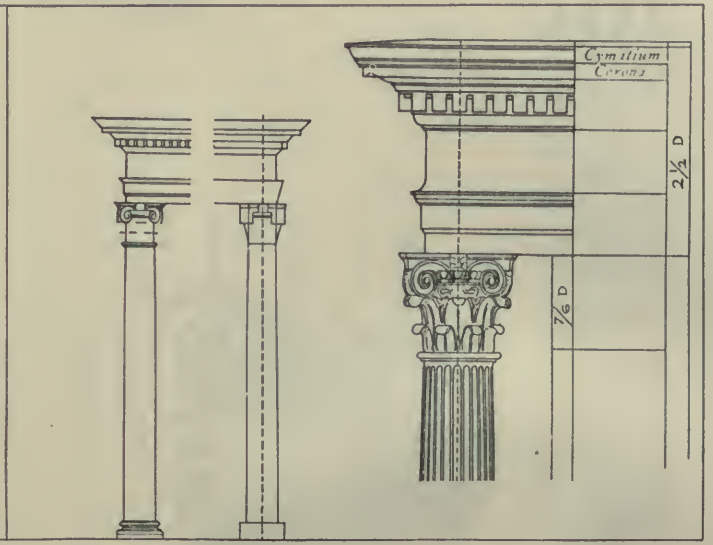
PLAT

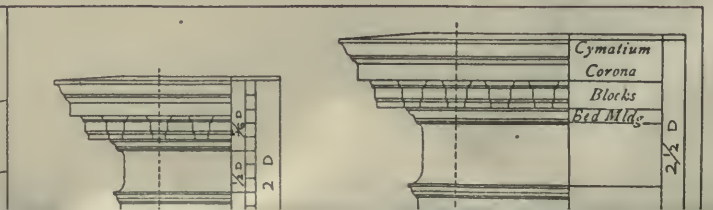
COMPOSITE ORDER

AFTER VIGNOLA





AFTER PALLADIO



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in a large Congé over the Architrave, and the Corona is undercut with a large quirked Cyma Recta, making a drip.

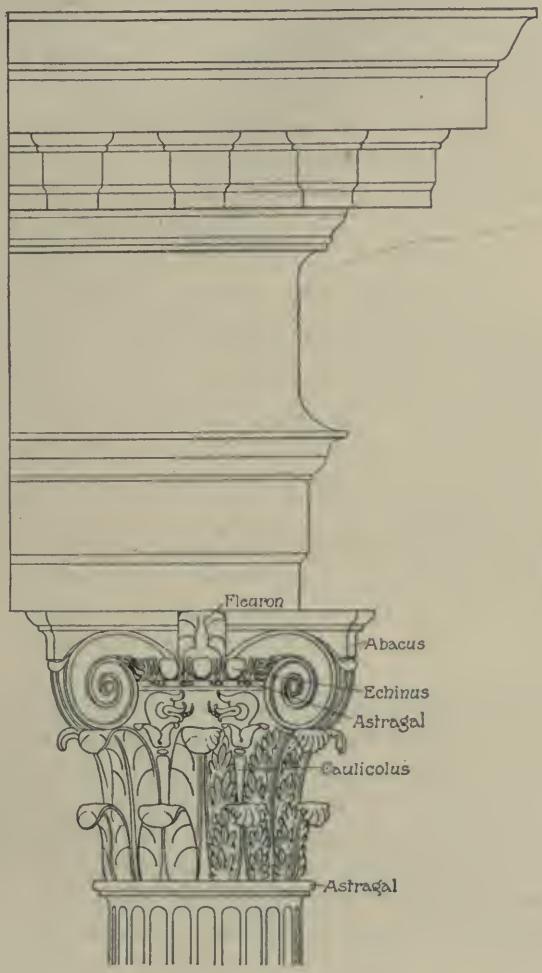

Fig. 83

Palladio's Composite Entablature, Fig. 83, is more characteristic than Vignola's, the parts being fewer and larger. The Architrave has two Bands, the Frieze terminates in two large Congés, and the Cornice is divided into two equal

parts, each half a Diameter high. The upper half is shared about equally by the Cymatium and the Corona, and the lower half is almost entirely taken up by a series of large brackets, or blocks, a third of a Diameter high, and one-fourth wide, divided into two Bands. The inner face of the Double Block comes just in line with the Frieze below, Fig. 102. The bands and mouldings that decorate the Blocks are continued between them.

These dimensions apply to Palladio's entablature where it is made of the same size as Vignola's, that is to say, a quarter of the height of the column, or two Diameters and a half. But Palladio himself made his Composite entablature only two Diameters high, or one-fifth the length of the column, cutting down the Frieze to half a Diameter, the Architrave to two-thirds, and the Cornice to five-sixths. If the dimensions of Palladio's Cornice given in the table are, accordingly, taken from the upper diameter of the shaft instead of from the lower, they will exactly conform to Palladio's own usage.

The Block entablature used by Scamozzi for his Composite Order is even less than two Diameters in height, and this seems to have been the case also with the entablature of the Olympiæum at Athens, which Palladio is thought to have imitated.

The mouldings below the Blocks are often made to project more than in Palladio's example. This increases their distance apart, on centers, since one must still come over the axis of the column and the one on the corner must be as far out as the end of these mouldings. The Blocks also vary considerably in length in different examples.

The upper part of the Composite Capital, as has been said, is often used alone as a variety of the Ionic Capital.

The Composite Capital is employed in the Arch of Titus in Rome, and elsewhere, with a Corinthian entablature, and the Block Cornice occurs in the so-called frontispiece of Nero, as well as in the temple at Athens, in connection with a Corinthian Capital.

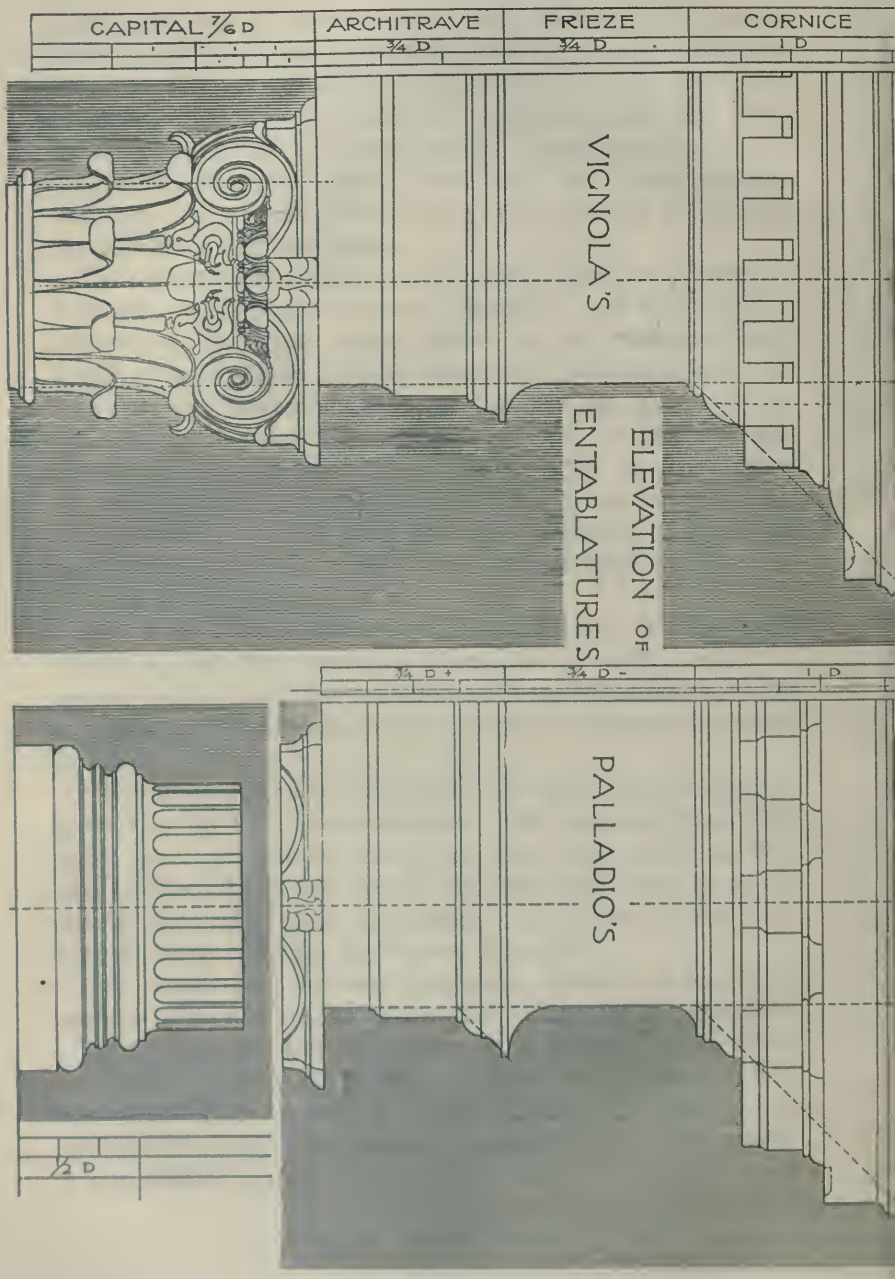

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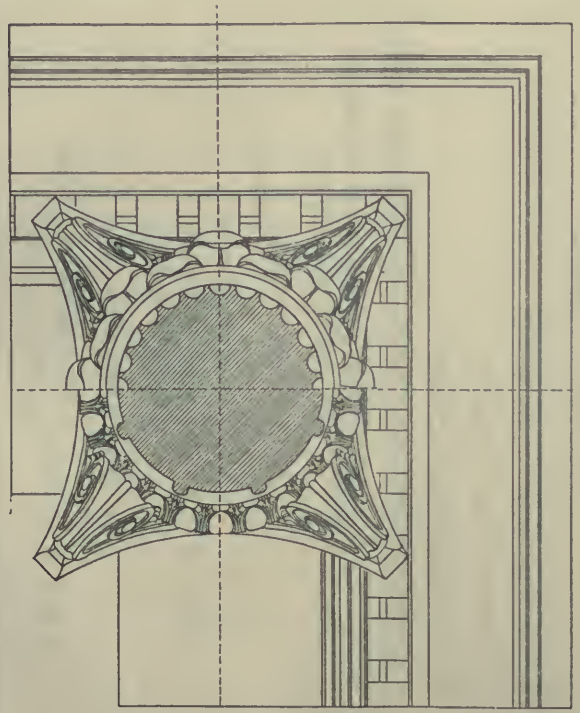
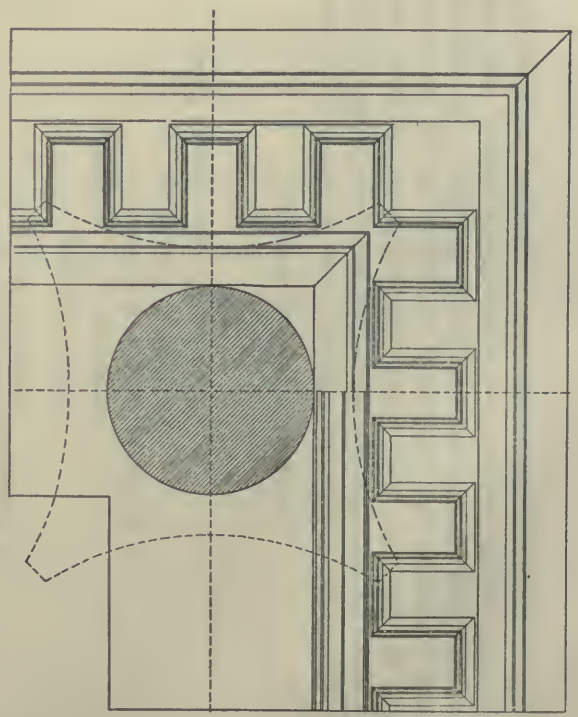
PLATE

COMPOSITE ORDER





PLAN OF ENTABLATURES LOOKING UP

IGNOLA

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TABLE OF THE COMPOSITE ORDER—PLATES XII AND XIII

$\frac{1}{2}\ D = \frac{3}{6}\ D$ equals { height of Scrolls. / space between Scrolls.

$\frac{3}{4}\ D$ equals distance of Eyes, o. c.

$1\frac{1}{2}\ D = \frac{9}{6}\ D$ equals { width of Scrolls. / width of Plinth. / width of Abacus.

VIGNOLA'S CORNICE

$\frac{1}{4}\ D$ equals { height of Dentil Band. / distance of Dentils on centers.

$\frac{3}{4}\ D$ equals distance from Axis to face of Double Dentil.

$\frac{1}{6}\ D$ equals height of Dentils.

$\frac{1}{6}\ D$ equals width of Dentils.

$\frac{1}{12}\ D$ equals width of Interdentil.

PALLADIO'S CORNICE

$\frac{1}{3}\ D$ equals { height of Block. / length of Block.

$\frac{1}{4}\ D$ equals { width of Block. / height of Lower Band. / height of Corona. / height of Cymatium. / distance between Blocks (*plus*).

GEOMETRICAL RELATIONS

19. The dimensions and proportions set forth in the previous paragraphs, and recapitulated in the Tables, enable one to draw the Five Orders, according to Vignola, with great accuracy and sufficiently in detail for all the ordinary purposes of the draftsman and designer. The figures for the larger features are easily remembered, and the smaller divisions and subdivisions can for the most part be

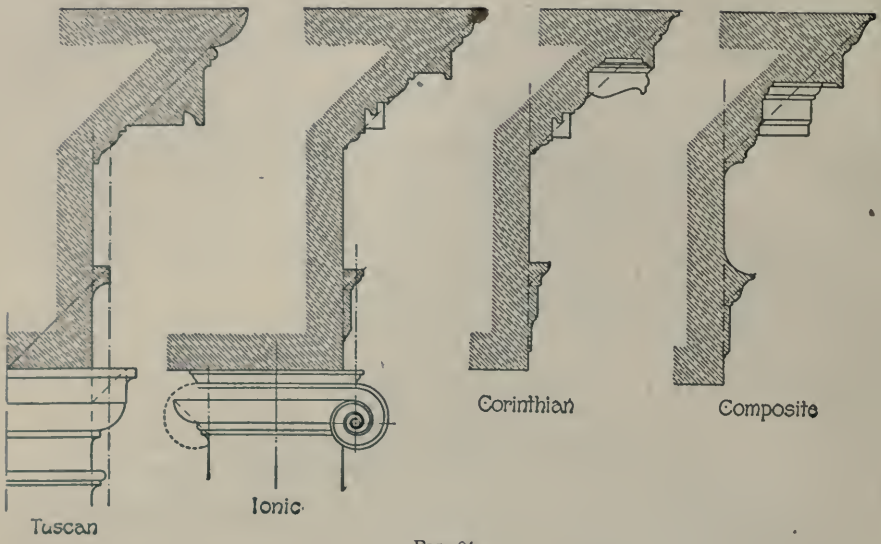

Tuscan
Ionic
Corinthian
Composite

Fig. 84

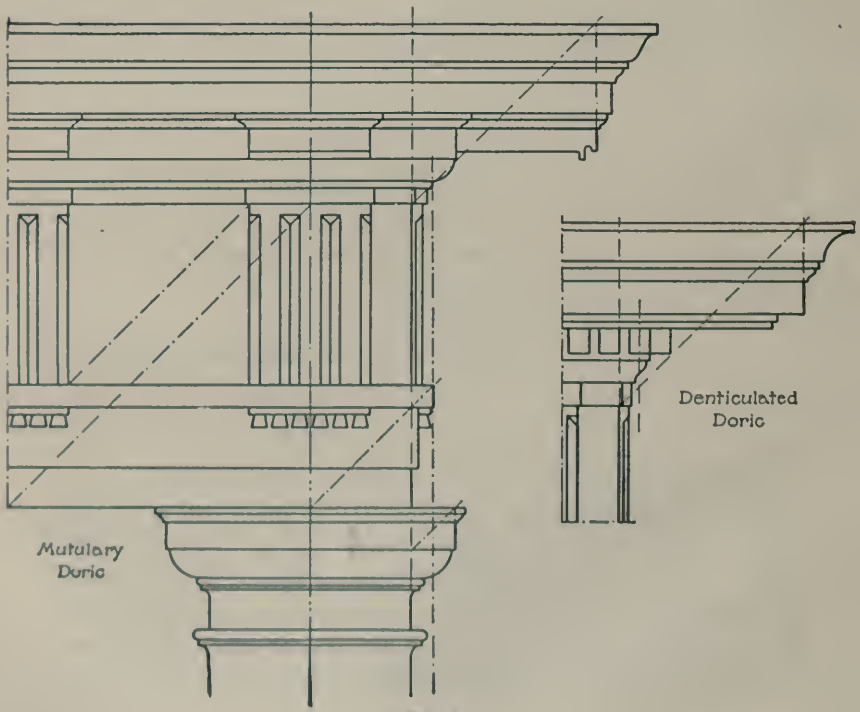

Mutulary
Doric
Denticulated
Doric

Fig. 85

obtained by dividing the larger into two, three, four, or five equal parts.

But besides these arithmetical proportions some geometrical relations may be pointed out, which are calculated greatly to facilitate the work of draftsmanship, drawing being naturally more closely related to Geometry than to Arithmetic.

20. Lines at 45 Degrees.—The proportions of any figure that is as wide as it is high, and which can accordingly be included within a square, are most easily determined by drawing the diagonal of the square, that is to say, by drawing a line with a 45-degree triangle. Such figures are, as is shown in the Illustrations, the projections of:

1. The Echinus, in the Tuscan, Doric, and Ionic Capitals, Figs. 84 and 85.

2. The Abacus, in the Tuscan and Doric Capitals, Figs. 84 and 85.

3. The Astragal, in all the Orders, Fig. 86.

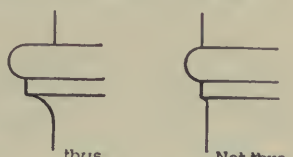


FIG. 86

4. The Architrave, including the Tænia, in the Tuscan and Doric Orders, counting from the axis of the Column, Figs. 84 and 85.

5. The Tænia itself, and the Cymatium that takes its place, Figs. 84 and 85.

6. All the Cornices, except the Doric, Fig. 84.

A line drawn at 45 degrees through the Doric Cornice from the top of the Frieze gives, where it cuts the upper line of the Cornice:

1. The face of the Corona, in the Denticulated Doric, Fig. 85.

2. The face of the Mutule in the Mutulary Doric, Fig. 85.

A line drawn at 45 degrees through the Doric Architrave and Frieze, from a point on the axis of the Column and of the Triglyph, taken either at the bottom of the Architrave or at the top of the Frieze, gives the axis of the next Triglyph, and so on, Fig. 85.

A 45-degree line also gives:

1. The Shape of the Metope, Fig. 85.
2. The Caps of the Pedestals, except the Tuscan, Fig. 87.
3. The Plinths of the Doric and Attic Bases, Fig. 87.

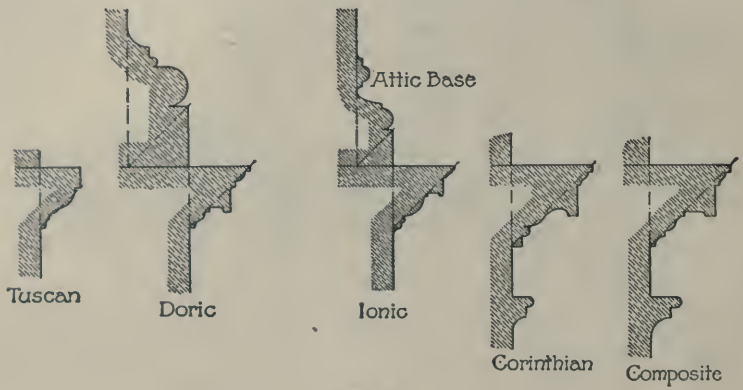


FIG. 87

Lines drawn at an angle of 45 degrees across the Corinthian Capital from the extremities of its lower diameter give the width of the Abacus, Fig. 88.

Where they cut the line of the upper diameter of the shaft, extended, they give the depth of the Scroll, Fig. 88.

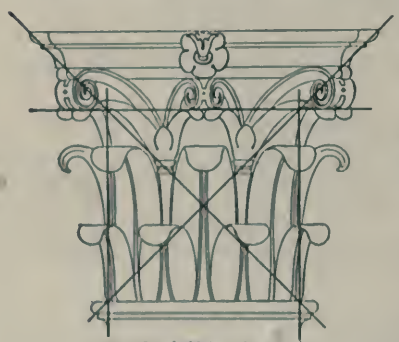


FIG. 88

21. Lines at 60 Degrees. — In like manner, lines drawn at an angle of 60 degrees through the Bed Mould of the Ionic Cornice from a point on the axis of the Column, taken either on the upper line of the Frieze or on the upper edge of the Dentil Band, give, where they touch the upper line of the Frieze and the upper line of the Dentil Band, the Axes of the Dentils, and the outer face of the Double Dentil, Fig. 89.

Similar lines drawn at 60 degrees in the Corinthian Cornice, taken from a point where the axis of the Column cuts the lower edge of the Corona, give: (*a*) Where they cut the lower edge of the Corona, the upper line of the Frieze, and

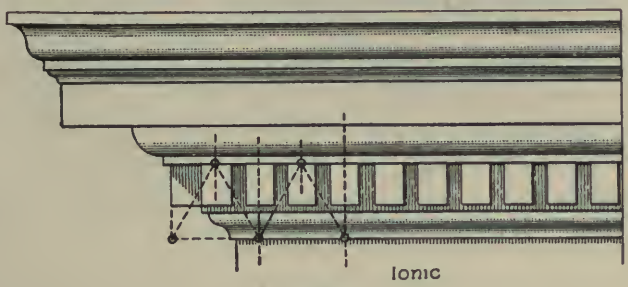


FIG. 89

the lower line of the Ovolo, the Axes of the Modillions and of the Dentils, and the outer face of the Double Dentil, very nearly, Fig. 90. (*b*) Where they cut the lower line of the Modillion Band, the width of the Modillion, and the outer face of the Modillion Band, Fig. 90.

(The distance from the edge of the Corona down to the lower edge of the Modillion Band is one-third the distance

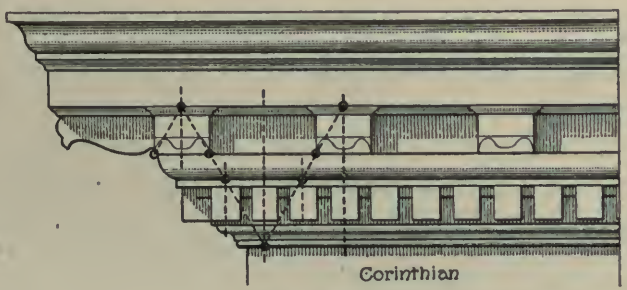


FIG. 90

down to the top of the Frieze, and the distance down to the lower edge of the Ovolo, one-half.)

22. The Ionic Volute.—The vertical line *a b*, Fig. 91, through the center of the eye of the Ionic volute, and the

horizontal line *c d*, will mark in the circumference of the eye the four corners of a square within which a fret may be drawn whose angles will serve as centers, from which the curves of the volute may be described mechanically. The sides of the square above referred to should be bisected, and through the upper points thus located a horizontal line *e f* should be drawn. Now, with *e g* as a radius, the arc *g f* may be drawn as the first section of the volute. Now, through the point *h*, where the line *e f* bisects the

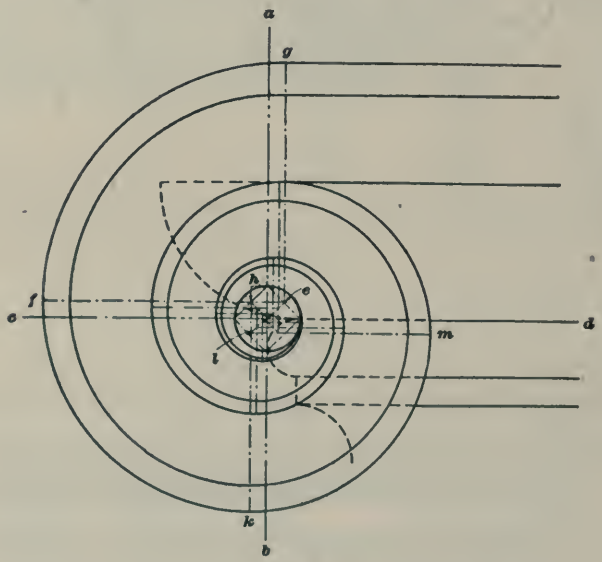


FIG. 91

side of the square, a vertical line *h k* should be drawn, and with *h f* as a radius the arc *f k* may be struck. From *h* and *e* lines should be drawn at 45 degrees, intersecting at the center of the eye, and the line extending from *h* to the center should be divided into three equal parts, through which the corners of the inscribed fret will turn. The point *l* on the line *h k*, marking the lower left-hand corner of the inscribed fret, is located $\frac{5}{6}$ of the distance between *h* and the point where *h k* bisects the lower side of the square. *l* then forms the center for the arc *k m*, and the rest of

the volute is described from centers found at the angles of the inscribed fret.

23. Vertical Lines.—The outer line of the upper Diameter of the Shaft gives, in all the Orders, Figs. 84 and 85, the face of the lower band of the Architrave, and the face of the Frieze.

In the Denticulated Doric, it gives, Fig. 85, the outer face of the first Dentil, next the Double Dentil.

In the Ionic and Corinthian Orders, it gives the axis of the first Interdentil.

The outer line of the lower Diameter of the Shaft, produced upwards, gives, Figs. 84 and 85:

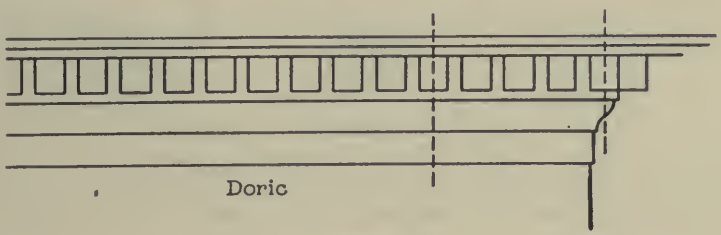


FIG. 92

1. The projection of the Astragal, in all the Orders, except the Tuscan and Doric.

2. The projection of the Tænia, in the Tuscan and Doric.

3. The projection of the Fillet, in the Bed Mould of the Mutulary Doric, Fig. 85.

4. Twice the projection of the Triglyph, which is seen in profile.

5. Half the projection of the Tuscan Bed Mould, of the Tuscan and Doric Abacus, and of the Doric Mutule Band.

It also gives the Axis of the Extreme Dentil, or first half of the Double Dentil, in the Denticulated Doric, Ionic, Corinthian, and Composite Orders, Figs. 92, 93, 94, and 95, and the position of the Eye of the Ionic Scroll, which is on a level witn the bottom of the Echinus, Fig. 91.

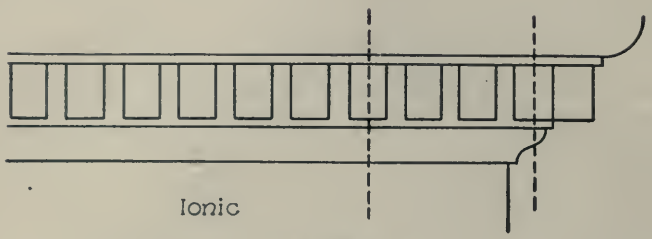


FIG. 93

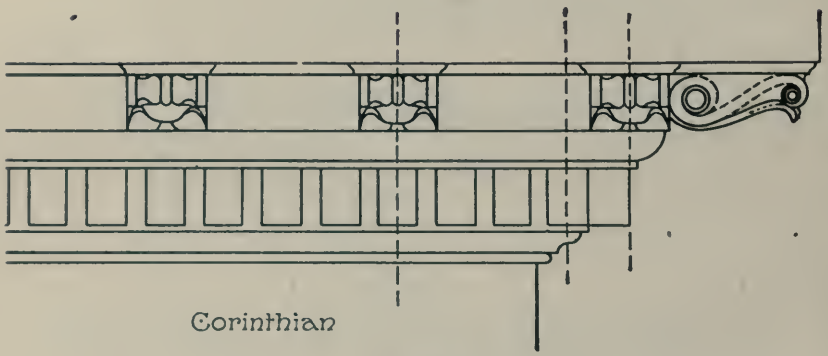


FIG. 94

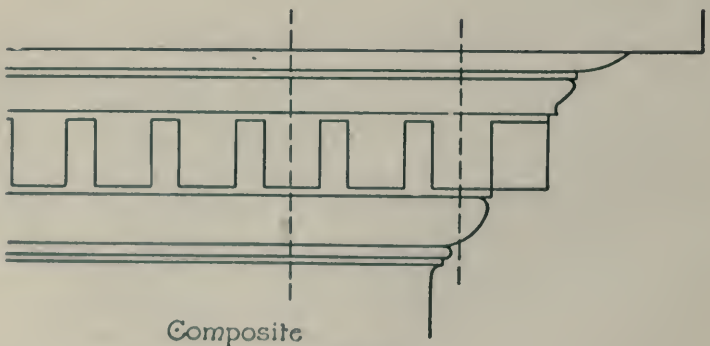


FIG. 95

DRAWING

24. General Proportions.—Since the relative size of all the parts, in Vignola's Orders, is fixed, any of them can be drawn out in accordance with these rules, if a single dimension is determined. The width of a Dentil or the length of a Modillion suffices to determine everything else. But the data generally given are either the lower Diameter of a Column, the height of a Column, or the whole height of the Order, with or without a Pedestal.

I. If the lower Diameter is given, the procedure is as follows, Fig. 96: Divide it in two, draw the axis of the Column, and then divide each half into three equal parts, Fig. 109; this gives the scale of sixths. Divide in two the two outer sixths; this gives the upper Diameter of the shaft, which is five-sixths. Lay off on the axis the height of the Column—by Diameters, 7, 8, 9, or 10—and of the Entablature, which is one-fourth the height of the Column. Mark the height of the Base, half a Diameter, or three-sixths, and then that of the Capital, two-, three-, or seven-sixths.

Then divide the total height of the Entablature into seven, eight, eighteen, or ten equal parts, according as it is Tuscan, Doric, Ionic, or Corinthian, or use halves, quarters, or eighths of a Diameter, and mark the heights of the Architrave, Frieze, and Cornice, drawing horizontal lines through the points of division. (Fig. 96 illustrates this procedure for the Tuscan Order.) Then carry up, vertically, the outer lines of both the upper and the lower Diameters of the Shaft, drawing from the point where the line of the upper Diameter cuts the lower edge of the Cornice a line at 45 degrees to determine the projection of the Cymatium, or that of the Mutule or of the Corona.

Add one-third of the height of the Column for the Pedestal. Divide this into three equal parts, taking the upper third of the upper third for the Cap, and the lower two-thirds of the lower third for the Base. Vignola makes the Base of the Pedestal only one-ninth of the height of the Pedestal instead of two-ninths as here determined.

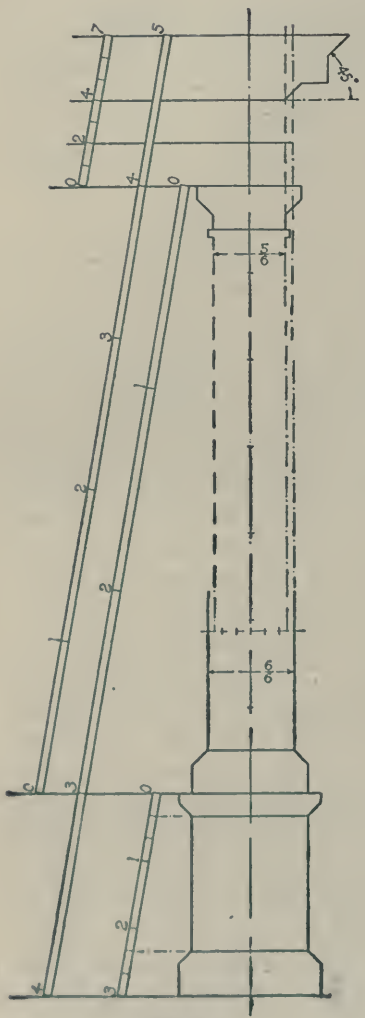


FIG. 96

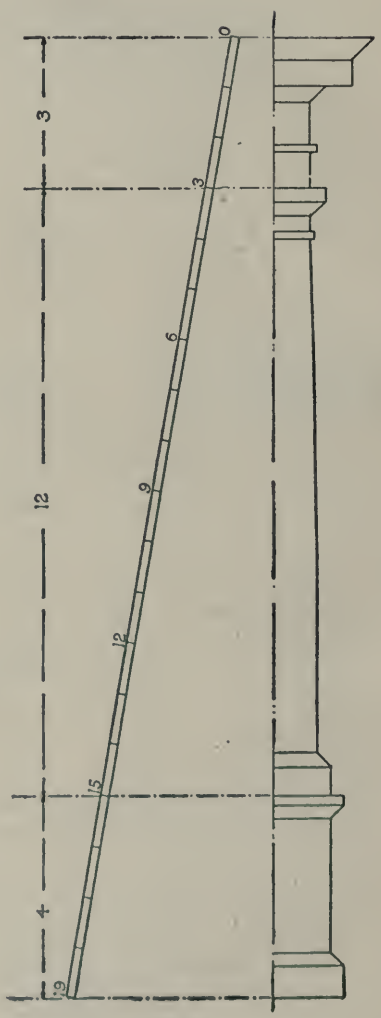


FIG. 97

II. If the height of the Column is given, a fourth part of this added at the top gives the height of the Entablature, and a third part added below gives the height of the Pedestal, Fig. 96. One seventh, eighth, ninth, or tenth of the height of the column gives the lower Diameter of the Shaft. The drawing may then be carried forwards as above.

III. If the total height of the Order is given, without the Pedestal, a division into five equal parts gives four parts for the Column and one for the Entablature, Fig. 96.

If there is a Pedestal, and it is of the regular height of one-third the height of the Column, the division of the total height must be into nineteen equal parts, four of which go to the Pedestal, twelve to the Column, and three to the Entablature, Fig. 97.

The lower Diameter can then be obtained from the height of the Column, and the drawing completed, as above.

NOTE.—The division of a given dimension into equal parts may be effected with the dividers, or, more easily, by using a scale of equal parts that are the same in number as the desired subdivisions, but a little larger, and holding this scale obliquely between the extreme limits of the space to be divided, Figs. 96 and 97. The division of vertical dimensions into five, seven, eight, nine, ten, eighteen, or nineteen equal parts, as here required, is thus easily accomplished. To insure accuracy, the lines marking these divisions should be horizontal, not normal to the direction of the scale.

25. Cornices.—The Tuscan Cornice may be drawn by dividing its height into quarters, as is done in the figure, giving the upper quarter to the Ovolo and the lower to the bed mould, and the middle half to the Corona, Bead, and Fillet, Fig. 98. A 45-degree line gives the projection of the Bed Mould, Ovolo, and the Cornice itself.

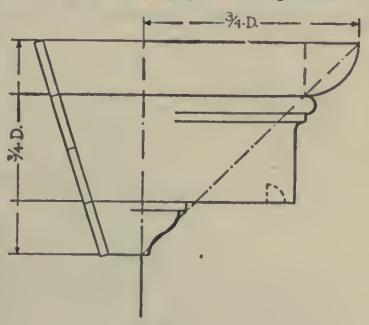


FIG. 98

The Doric Cornice is also divided in four equal parts, the upper one comprising the Cymatium and Fillet, the next the Corona and the small Cyma Reversa above it, the third the Mutules (or the Dentils with the Mutules above them),

and the lower one the Bed Mould, including the cap of the Triglyph, which is narrower in the Mutulary Doric than in the Denticulated by the width of the Fillet above it, Figs. 99 and 100.

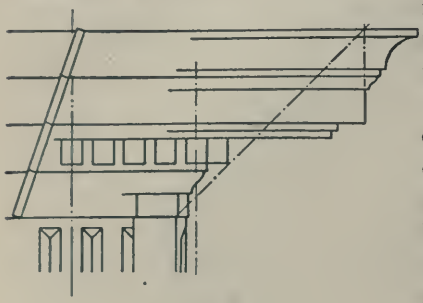


Fig. 99

A 45-degree line drawn outwards from the middle of the top of the Abacus gives, where it cuts the lower line of the Frieze, the projection of the Tænia. A similar line, where it cuts the upper line of the Frieze, gives the axes of the next Triglyph, Fig. 85. The Triglyphs are drawn next, with their Cap, and the Regula and Guttæ, then the Mutules, or the Dentils.

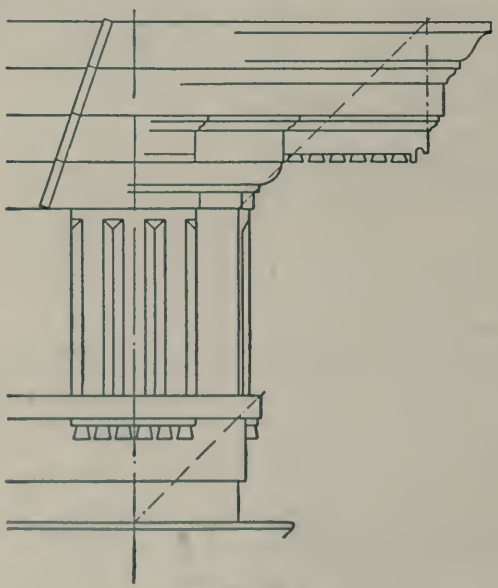


Fig. 100

In the Doric Order a line at 45 degrees drawn from the bottom of the Cornice gives the face of the Corona in the

Denticulated Doric, the face of the Mutule in the Mutulary; in the other Orders, a similar line gives the projection of the Cymatium, Figs. 99 and 100.

In putting in Dentils, draw first the one over the Axis of the Column, then the Double Dentil, the first half of which is centered over the lower face of the Column, and then the intermediate ones, three, two or one, according as the Order is Doric, Ionic, Corinthian, or Composite, Figs. 92, 93, 94, and 95. The Interdentil is half the width of the Dentil, except in the Composite.

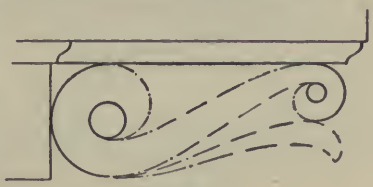
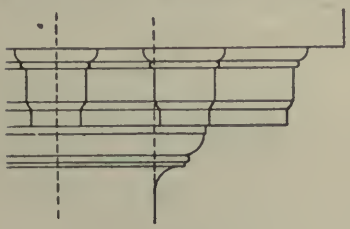
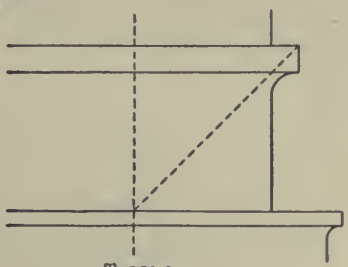


Fig. 101

One Corinthian Modillion comes over the axis of the corner column and one over the outer face of the Double Dentil, Fig. 94. In drawing the side of a Modillion, put in first, at the outer end, a semicircle half its height and one at the inner end nearly the whole height; then the rosettes, one twice as large as the other; then the connecting curves, and finally the leaf beneath, Fig. 101.



Composite
Fig. 102

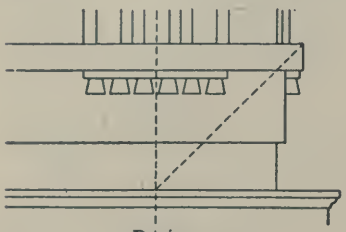


Tuscan
Fig. 103

In Palladio's Composite Cornice, one block is set over the axis of the column, and the double block at the corner has its inner face on a line with the face of the Frieze below. The blocks are about half a Diameter o. c., the interblock being one-twenty-fourth of a Diameter wider than the block itself, Fig. 102.

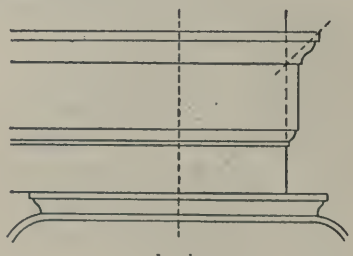
26. Architraves.—The Tuscan Architrave, Fig. 103, has but one fascia or band, the Composite two, Fig. 107, and

the Corinthian three, Fig. 106. The Doric has sometimes one, but generally two, Fig. 104, and the Ionic has generally two, Fig. 105, but sometimes three. The lower band is always the narrowest and is set on a line with the face of the shaft below and of the Frieze above.



Doric

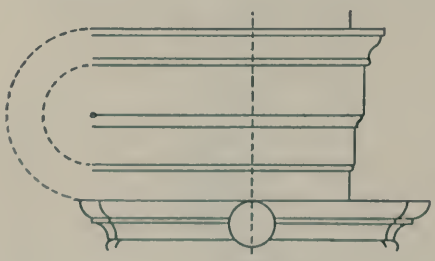
FIG. 104



Ionic

FIG. 105

All the Architraves have a Cymatium, or crowning member, which in the Tuscan and Doric is a broad Fillet, called the Tænia, and in the Ionic and Corinthian is a large Cyma Reversa, surmounted by a Fillet and generally supported by a bead. The lower bands often have, as a Cymatium, a small Cyma Reversa, Bead, or Ovolo, and all three bands are sometimes sloped backwards, as in the Entablature of the porch of the Pantheon in Rome, Fig. 108, so as to diminish the projection of the crowning mouldings, which generally have a projection, beyond the face of the Frieze, equal to their height.



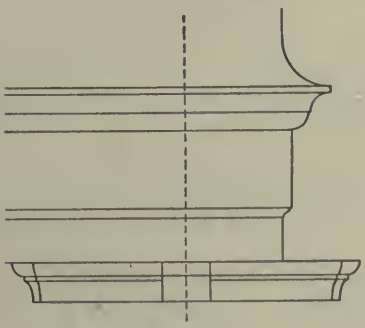
Corinthian

FIG. 106

The Tuscan Tænia has beneath it the characteristic Tuscan congé, Fig. 103. Beneath the Doric Tænia, and directly under each Triglyph, Fig. 104, is a narrow Fillet, which sometimes has a beveled face, called the Regula, beneath which are the six Guttæ. These are sometimes frustra of cones, as in the Greek Order, sometimes of

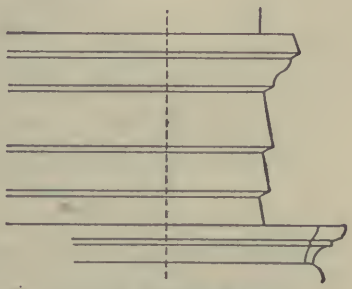
pyramids. The Guttæ, which almost touch at the bottom, are twice as high as the Regula. Both together are just as high as the Tænia, or one-twelfth of Diameter, so that the three are one-sixth of a Diameter high. They accordingly occupy the upper third of the height of the Architrave, which is three-sixths high, the lower band occupying the lower third.

The two lower bands of the Corinthian Architrave occupy half its height, and the lower band with its Cymatium is



Composite

FIG. 107



Porch of the Pantheon

FIG. 108

just as wide as the mouldings that crown the upper band. The second band with its Cymatium is just as wide as the third band without, Fig. 106.

27. Capitals and Bases.—In drawing Capitals, it is best to put in first the axis of the column and the vertical faces of the Shaft; then the horizontal lines, and lastly the profile, beginning at the top. But in drawing Bases, it is best to put in the profile of the moulding before the horizontal lines.

The Tuscan Base, Fig. 109, is half a Diameter high, half of which goes to the Plinth and half to the Base Moulding, which is made to include the Cincture, or broad Fillet at the bottom of the Shaft, which in the other Orders is not counted as part of the Base. But this is merely saying that the Tuscan Base is not quite half a Diameter high.

All the other Bases, including the Attic Base, are just half a Diameter high. All the Plinths are eight-sixths wide and one-sixth high, except the Tuscan and Doric, which are

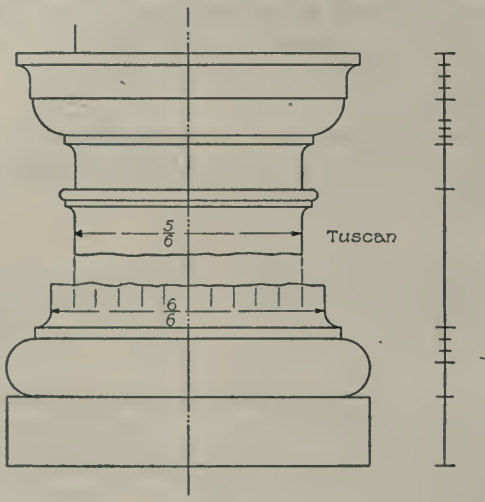


Fig. 109

one-quarter of a Diameter high. It is not worth while to define the proportions of the other Bases.

The Tuscan Capital, Fig. 109, is half a Diameter high, or three-sixths, the upper sixth comprising the Abacus with its Fillet, the middle sixth the Echinus and the Fillet below it, and the lower sixth the Necking. The upper Fillet is a

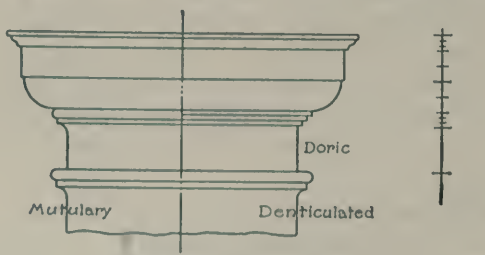


Fig. 110

quarter of a sixth wide, the lower one a sixth of a sixth. The Abacus is seven-sixths wide; i. e., it projects one-sixth on each side beyond the upper diameter of the Shaft.

The Doric Capital, Fig. 110, is also three-sixths of a Diameter high, the two upper sixths being divided into thirds, and these again into thirds, to give the height of the smaller mouldings. The Denticulated Capital generally has three Fillets, the Mutulary, a Bead and Fillet.

The Astragal, which in the other Capitals is one-twelfth of a Diameter high, or half a sixth, is in the Tuscan and Doric Orders one-fourth smaller, or one-sixteenth of a Diameter, the Bead being one-twenty-fourth of a Diameter high, or a quarter of a sixth. In drawing the Astragals, draw first the horizontal line at the top, which occupies two-thirds of the projection, otherwise the Congé below is apt to be slighted. The Bead and Congé should have their full measure of 180 degrees and 90 degrees, Fig. 111.

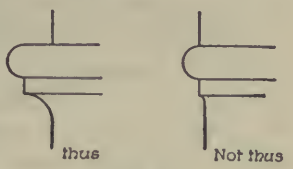


Fig. 111

The Ionic Capital, which is one-third of a Diameter in height, or four-twelfths, is also divided into three parts, but unequally. The Abacus occupies the upper quarter, or one-twelfth, and had better be put in first. The Echinus occupies rather more than half of the remaining space, namely, five-ninths. In the Composite Capital, the Abacus occupies the upper sixth, and a little more, and the Echinus and the Astragal the next one, Fig. 82.

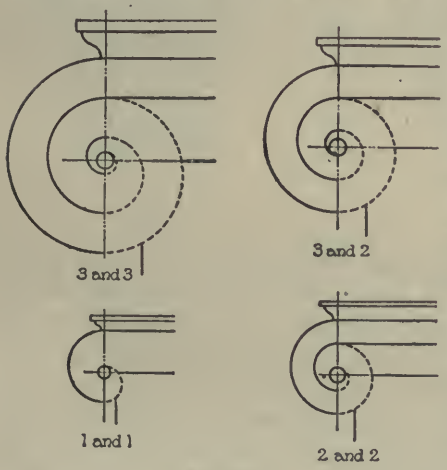


Fig. 112

The Eyes of the Ionic Scroll are in line with the top of the Astragal and with the lower Diameter of the Column, and should be put in first, Fig. 112. The Scrolls make three

complete turns and finally are tangent to the upper side of the eye. They can best be drawn by putting in first three semicircles on the outer side, and then three smaller ones on the inner side. In working on a small scale, two semicircles on each side will suffice, or three on the outer side and two on the inner, as in the plates. But one is never enough. The Eyes of the Composite and of the Roman Ionic Capitals are set nearer together, Fig. 82.

In drawing a Corinthian Capital, Fig. 113, it is best to put in first the Astragal and the lower line of the Architrave, carrying up on each side the outer lines of the Shaft; then the Abacus, Fleuron, and Scrolls. The double scroll at the corner falls just outside these vertical lines. It appears

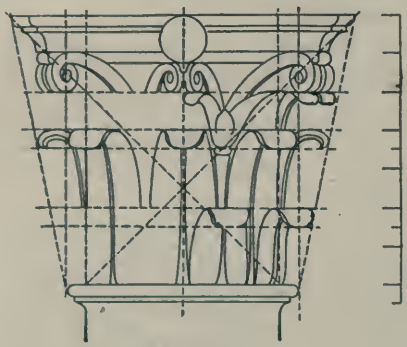


Fig. 113

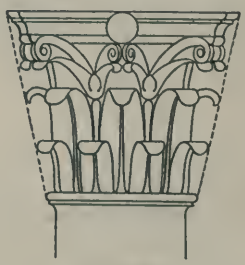
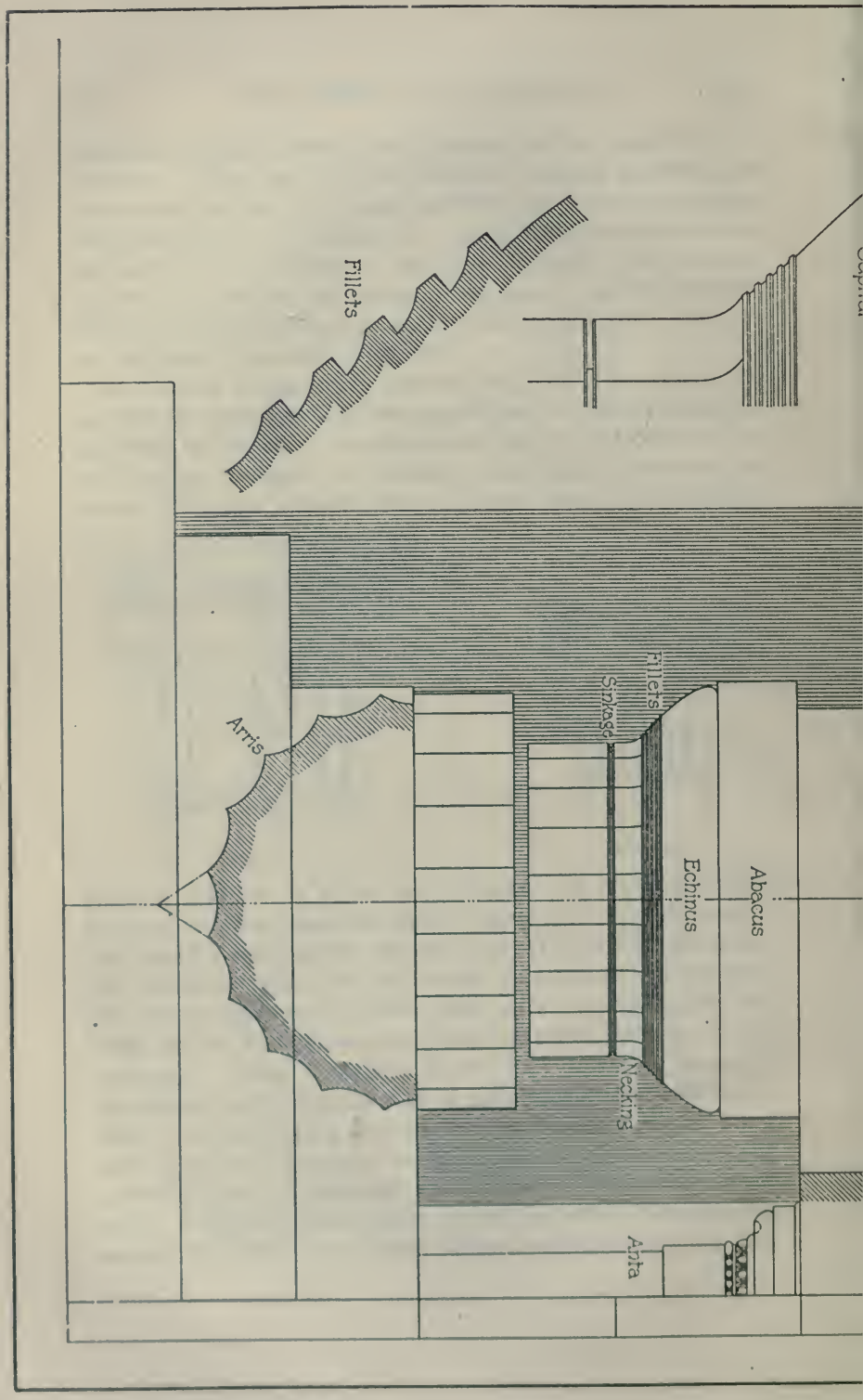


Fig. 114

slightly elliptical in shape, not circular, and the outer scroll is more elliptical than the inner, being more foreshortened. The small scrolls under the Fleuron are also foreshortened into ellipses. Then the five leaves of second row, the middle one in elevation, the two side ones in profile, and the other two at 45 degrees, carrying down the mid-ribs to the Astragal. Their tips turn down half a sixth, those of the corner leaves coming just on the outer lines of the upper shaft. Of the four leaves of the lower row, the two inner ones occupy the spaces between these mid-ribs, and the ends that turn over fall entirely within the outline of the lower parts. The two outer leaves extend on either side slightly beyond the width of the shaft below, and their tips fall just



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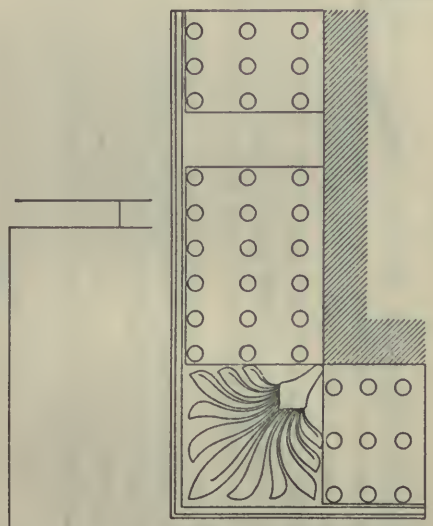
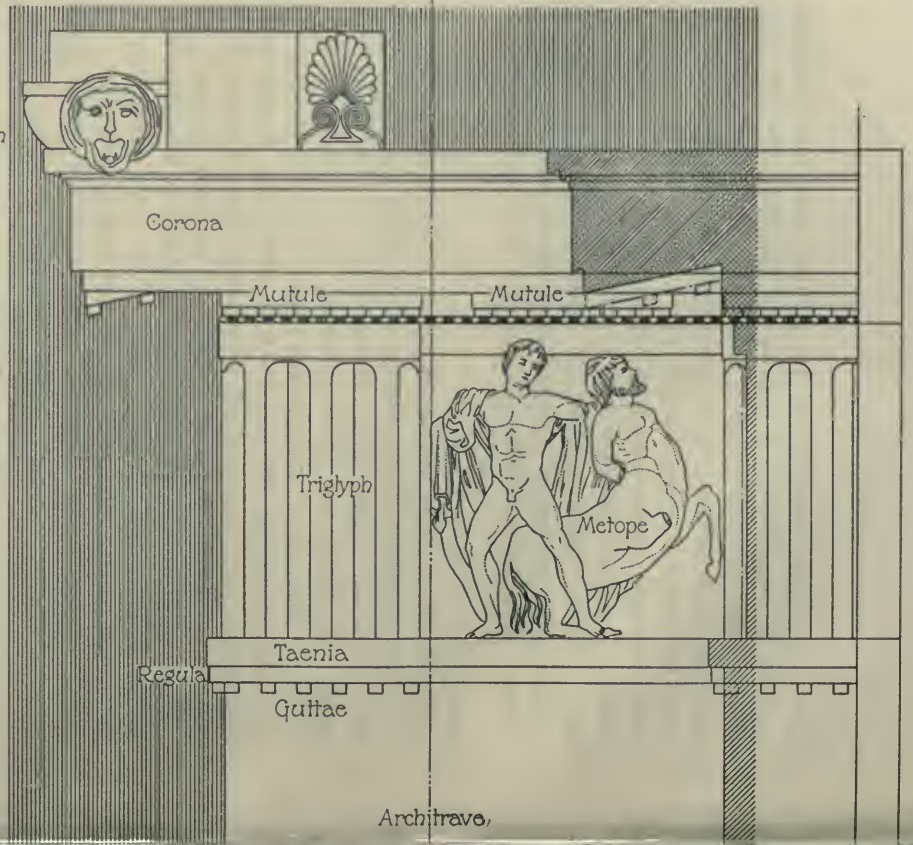
PLAT

THE GREEK ORDERS

DORIC ORDER
FROM THE
PARTHENON





VIGNOLA

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outside the lower line of the leaves, being about six-sixths of a Diameter apart. They accordingly come just over the outer lines of the lower Diameter, just as the tips of the corner leaves above them come on the lines of the upper Diameter.

A line drawn tangent to the Astragal and to the Abacus is also tangent in all three rows of leaves, very nearly. The Caulicoli, the Buttons, the third row of leaves, and the lower parts of the Volutes follow, in this order.

The smaller the scale of the drawing, the more straight and upright should the Acanthus leaves be made, Fig. 114.

THE GREEK ORDERS

28. Although the different examples of the Greek Doric and Ionic Orders differ considerably among themselves, both in the proportions of the Columns and in the treatment of details, the proportions of the Entablature are tolerably uniform and are, in general, the same for both Orders, the Architrave and Frieze being both about three-quarters of a Diameter in height and the Cornice about half a Diameter, Figs. 115 and 122. The Entablatures, as has been said, are about two Diameters high, however tall or short the Columns may be. Their chief characteristic is the height of the Architrave and the shallowness of the Cornice. The Diminution and the Entasis of the Columns begin at the bottom of the Shaft.

29. **The Greek Doric.**—The Greek Doric, Plate XIV, has no Base, the Shaft standing upon three large steps, the upper one of which is called the *Stylobate*, Fig. 115. It has generally twenty Channels, Fig. 116, which are generally elliptical in section, but some small Columns have only sixteen, or even, as at Argos, fourteen, Fig. 117. In a number of examples, an Arris instead of a Channel comes on the axis of the Column, as is seen both at Argos and at Assos, Fig. 118. Instead of an Astragal, a groove, or *Sinkage*, separates the Shaft from the Necking of the Capital, and the Channels

Fig. 115

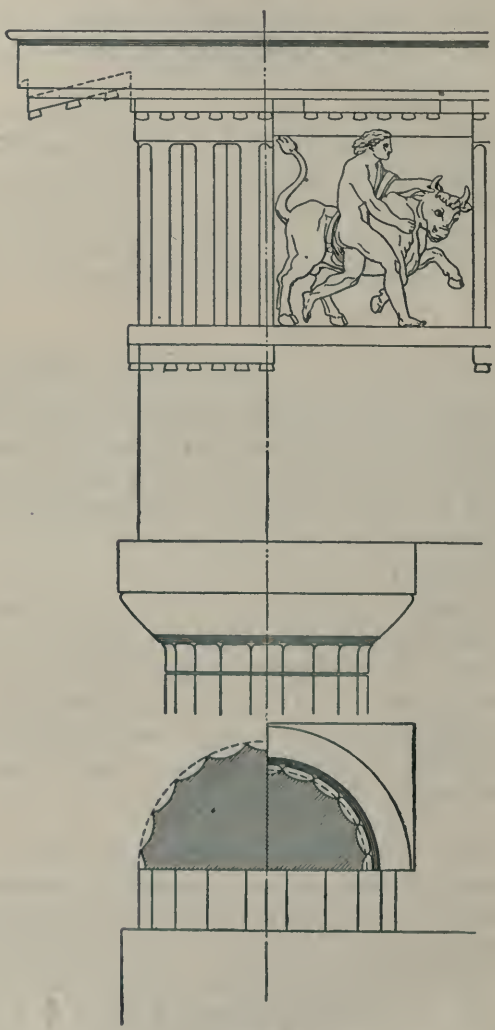

Fig. 116

are carried past it quite up to the Fillets at the base of the Echinus, Fig. 116. These Fillets vary in number. They are not vertical on the face, but follow and continue the

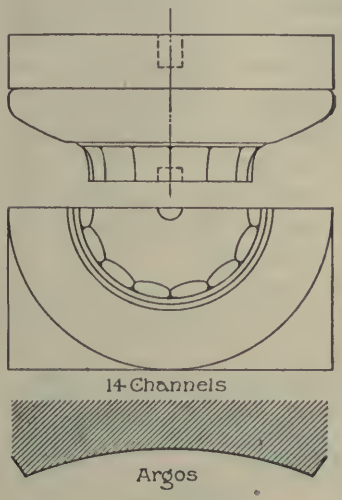

Fig. 117

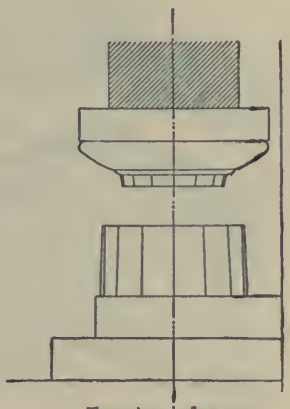

Fig. 118

slope of the Echinus, and their upper surfaces are also beveled, Fig. 119. The Echinus itself has an elliptical or hyperbolic profile, the earlier examples being the most convex and the later ones hardly differing from a straight line. The Abacus has no mouldings.

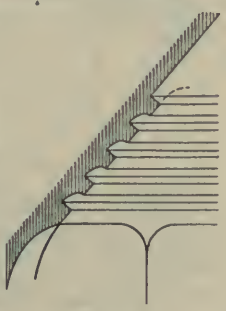
Fig. 119

The Architrave also is plain, and is crowned by a Tænia, below which is a broad Regula and six short Guttæ. In the earlier examples, the face of the Architrave is set just over and in line with the upper Diameter of the Shaft, but in the later ones it overhangs, coming over the lower Diameter, and the Echinus is made steeper, as well as straighter, as has been said, as if to support it.

The Triglyphs in the Frieze are shorter and broader than in the Roman Doric, and are set flush with the Architrave

below, the Metopes being set back. They are also thicker than the Roman Triglyphs, and the Channels are deeper, those at the edges cutting back at an angle of 45 degrees, the others generally at 60 degrees, and they run nearly up to the broad Fillet, or Band, that constitutes the Cap of the Triglyph. This is only as wide as the Triglyph itself, not breaking round the corners, and it is not continued between the Triglyphs, the Cap of the Metopes being narrower.

Fig. 120

As in Vignola's Denticulated Doric, the Mutules on

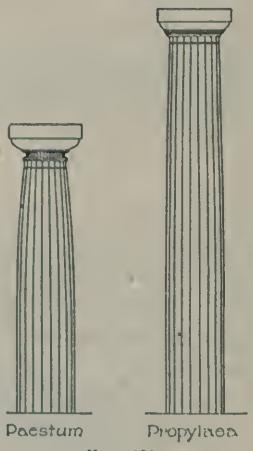

Fig. 121

the Soffit of the Corona slope up, and have only eighteen Guttæ, and they occur over the Metopes as well as over the Triglyphs, Fig. 120. The Mutules are thicker than those in the Denticulated Doric, though not so thick as in the Mutulary. The Cymatium generally consists of an elliptical Ovolo and a Fillet, the Soffit of which is beveled. But different examples vary in almost every one of these particulars.

At the corner of a building the Triglyphs are set, not over the axis of the Column, but at the extreme end of

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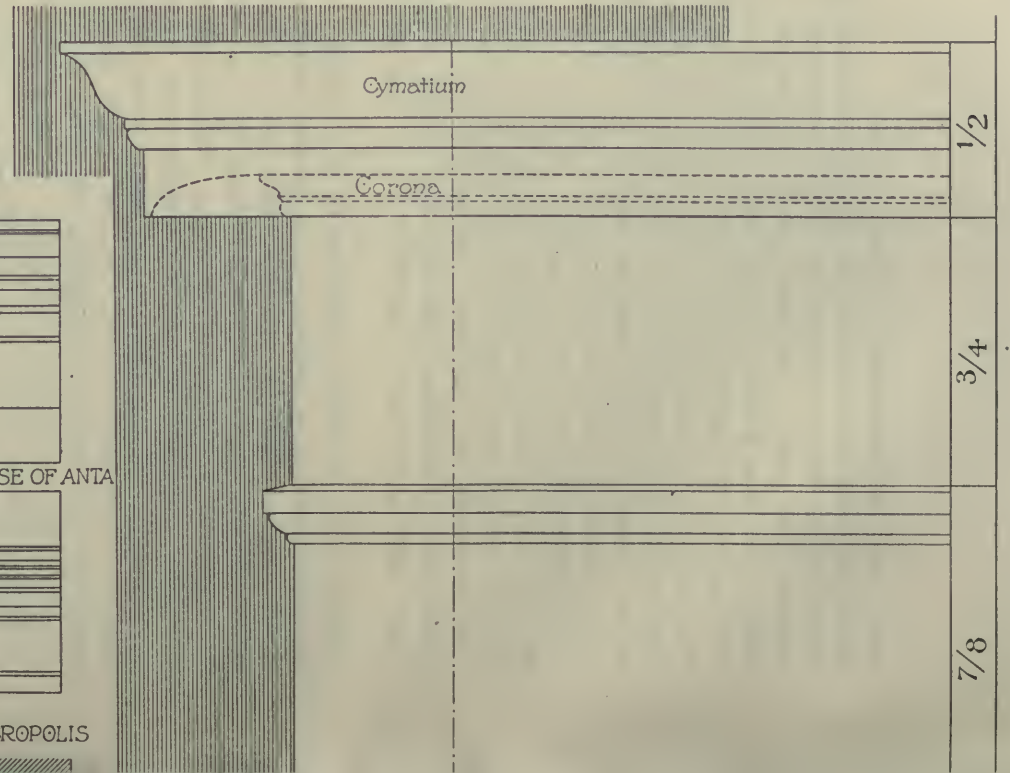
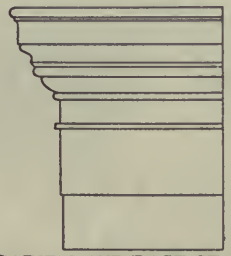
THE GREEK ORDERS

IONIC ORDER

FROM THE TEMPLE
ON THE ILLISSUS





CAPITAL AND BASE OF ANTA

IONIC BASE.
FROM THE CHORAGIC COLUMN ON THE ACROPOLIS

VIGNOLA

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the Frieze, two coming together and making a solid block. As the Metopes do not vary in size, being nearly square, this brings the three corner columns nearer together than the others.

In the best Greek examples the columns all slope in a little, so that the corner column, which is a little bigger than the others, has its inner face nearly vertical. The horizontal lines curve slightly, being convex up, the vertical faces incline a little, either out or in, and the mouldings are, as has been said, generally elliptical or hyperbolic in section, rather than arcs of circles.

The Columns vary in height from about five to eight Diameters, the earlier ones being the shortest, and the Entasis, or Curvature in the outline of the Shaft, and the Diminution in the width of the Shaft, from bottom to top, which sometimes amounts to one-third of the Diameter, are much more pronounced in the earlier examples than in the later ones, Fig. 121. This seems to show that the original of the Doric column was not a wooden post, as has been thought, nor a pile of masonry, but a piece of rubble work, probably, like the rubble walls, covered with stucco.

30. The Greek Ionic.—The general proportions of the Greek Ionic Entablature, Plate XV, are, as has been said, about the same as in the Doric, but the Columns are more slender, varying from about seven Diameters in height to more than ten, and the Architrave, Frieze, and Cornice are often made very nearly equal in height, Fig. 122.

The Base is like the Attic Base, except that the Scotia is larger, constituting the principal feature, that the upper Torus is larger than the lower one, that the Fillet above the Scotia projects as far as the face of this Torus, and that there is no Plinth. As the base is still half a Diameter high, the upper Torus and Scotia are very much larger than in the Roman Attic Base. The lower Torus is sometimes very small indeed, and is occasionally omitted altogether, as at Samos, Fig. 123, and in one of the Choragic columns on the south side of the Acropolis at Athens, Fig. 69.

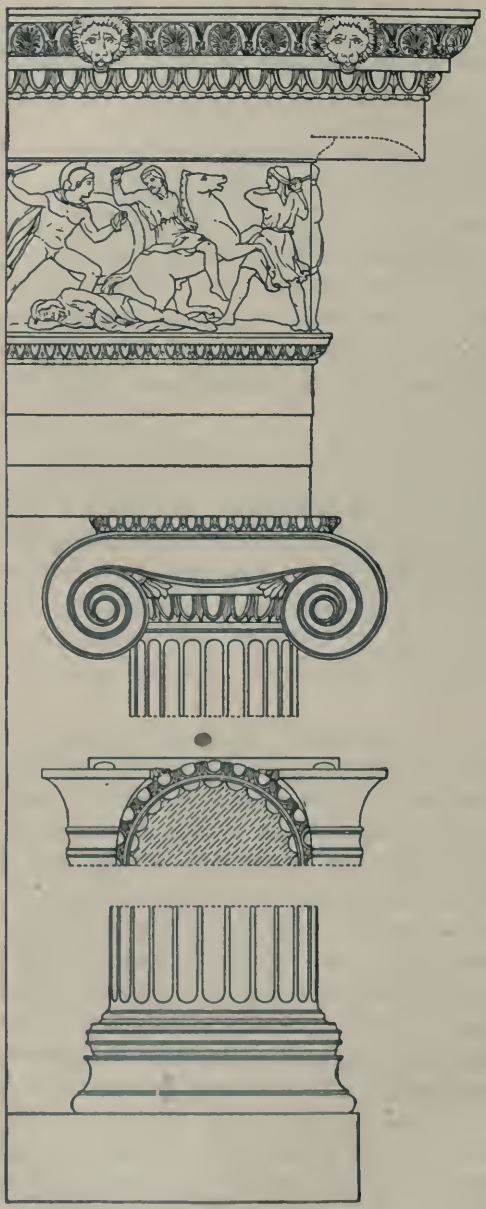

FIG. 122

The Shaft is fluted just as in the Roman Ionic, having twenty-four channels, and the Capital resembles, in general,

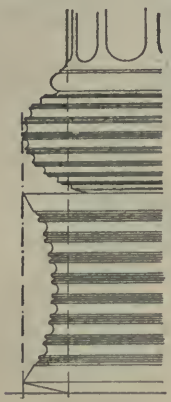

FIG. 123

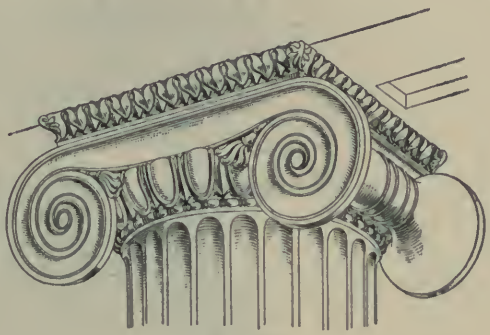

FIG. 124

Vignola's Capital with Balusters. But the Scrolls are much larger, measuring a full diameter and a half from side to side, and two-thirds of a Diameter from the Architrave to the bottom of the curve. The Capital, measured from the Architrave down to the Astragal, is half a Diameter high, instead of a third, the Abacus is very small, consisting generally of a single Ovolo, and the *Cushion* between the Abacus and the Echinus very wide, its lower outline being curved downwards, Fig. 124. The sprigs of honeysuckle, accordingly, do not cover the eggs and darts, five of which are visible between the Scrolls, instead of three.

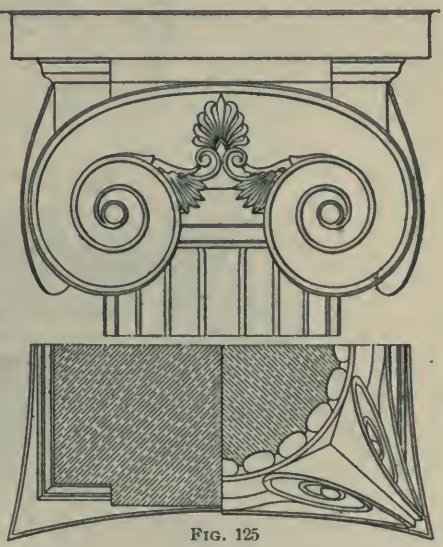

FIG. 125

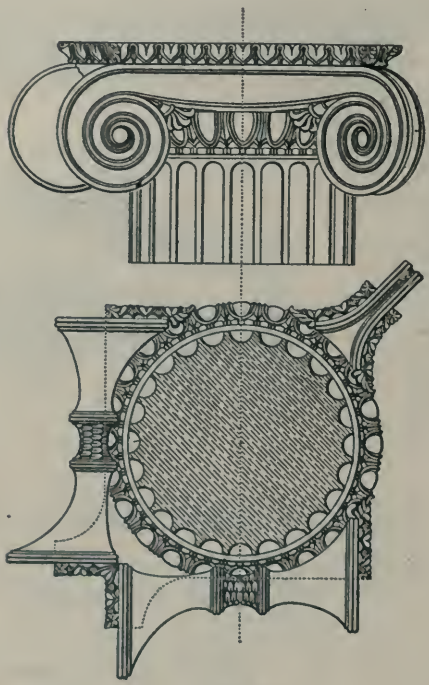

FIG. 126

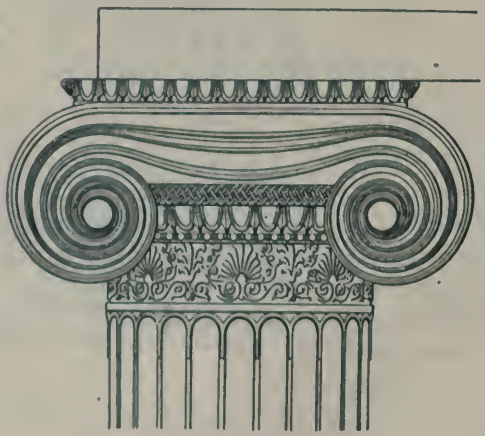

FIG. 127

The Architrave is sometimes plain, sometimes divided into two or three bands. The Frieze, or Zoöphorus, is wide, and the Bed Mould that crowns it is often countersunk into

FIG. 128

FIG. 129

the Soffit of the Corona, so that it does not show in elevation, Fig. 122. It is noticeable that though Dentils are, historically, a distinctively Ionic feature, they are omitted in many Greek examples. The Cymatium is a large Cyma

Recta, and has a Fillet and Bead below it, which is sometimes undercut, so as to make a little Beak Moulding.

But here, as in the Greek Doric, there is a great variety in the details of different buildings.

The four faces of the Capital are sometimes made alike, with double Scrolls on each corner, as in the Roman Ionic,

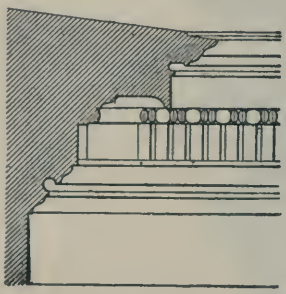

FIG. 130

FIG. 131

and these Scrolls are sometimes connected under the Abacus by a continuous curve, convex up, instead of by a horizontal line, Fig. 125. Sometimes a corner column shows Scrolls on the two outer faces and Balusters on the two inner ones, the double scroll on the corner projecting at 45 degrees, Fig. 126. Some examples have a wide Necking, adorned with the honeysuckle ornament, below the Echinus, Fig. 127.

FIG. 132

A few Corinthian Capitals are to be found in Greece, but the buildings in which they occur are in other respects Ionic, or even Doric, Fig. 128.

In the later Greek colonies in Southern Italy are found interesting varieties of all the Orders.

Their most marked peculiarity is the treatment of the details, Fig. 130. The Triglyphs and Dentils are long and slender, and the mouldings refined in outline and sometimes

PEDESTALS A

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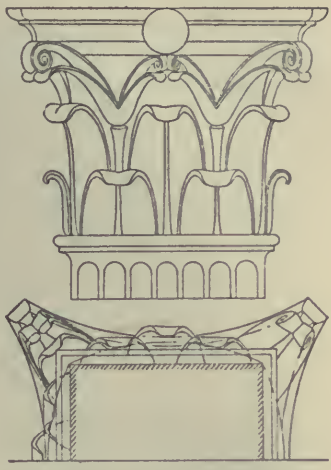
D PILASTERS



PLAN OF CORINTHIAN PILASTER CAPITAL
DOTTED LINE SHOWS LIP OF BELL

TERS

OF UPPER DIAMETER EQUAL
VER DIAMETER

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CORINTHIAN AND COMPOSITE

STALS

HE HEIGHT OF THE COLUMN. IT IS FREQUENTLY LESS
ES. DOTTED LINES SHOW VIGNOLA'S PROFILES.

separated by deep grooves, rectangular or circular, which are not to be mistaken for mouldings. The Architraves lose their importance, the Ionic Scrolls are often diminished in size, and the egg-and-dart moulding is changed into what are sometimes called *Filberts*, Fig. 130. The Corinthian Capitals receive a local development quite unlike that which was finally adopted in Rome itself, as may be witnessed at Tivoli, Fig. 131, Pompeii, and Herculaneum, Fig. 132. Since the revival of Greek architecture other variations have appeared in France, Germany, and Italy.

PILASTERS—PLATE XVI

31. The Romans made their Pilaster Capitals resemble those of the Columns. This works well, except with the Ionic Capital, in which the projecting Echinus presents an almost insuperable difficulty, Fig. 133.

As **Pilasters** do not generally diminish in width at the top, their Capitals are one-fifth broader than those of the

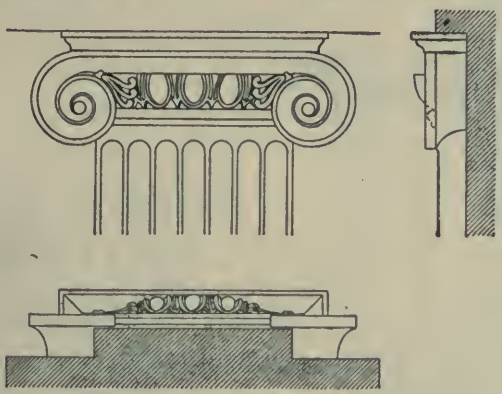
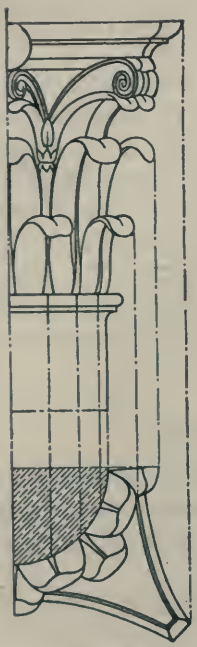


FIG. 133

Columns. But Pilasters are often made half a sixth narrower than the Columns at the bottom, and half a sixth wider at the top, having thus a uniform Diameter of five-sixths and a half. In the Corinthian Pilaster Capital, the extra space is taken up by making the leaves a little broader, and setting them farther apart, Fig. 134.



Column

Pilaster

Fig. 134

Column

Pilaster

Fig. 135

Pilasters generally project from the wall a quarter of their diameter, but sometimes have to be made thicker in order to receive string courses or other horizontal mouldings that they cut across. If made much thicker than this, they are apt to look thicker than the columns alongside them, and piers always do, noticeably enhancing the slenderness of the columns near them.

The Greeks gave their Pilasters Bases like those of the Columns, but Capitals of their own, composed of a series of mouldings, Fig. 135.

Pilasters are preferable to half columns, which always look smaller than they are, and have a mean appearance. Moreover, any mouldings that they interrupt seem to cut them in two, Fig. 136. In these respects, three-quarter columns are better, though they are apt to look clumsy, and they inevitably make an awkward junction with the wall behind them. They also make it uncertain which is the principal supporting member, the wall or the column.

From the Farnese Palace

FIG. 136

PEDESTALS—PLATE XVI

32. As has already been said, a short Pier is called a Post, and, if it supports something, a **Pedestal,** and the Pedestals that support Columns are generally made one-third the height of the Column. The Cap is one-ninth the height of the Pedestal, and generally consists of a Bed Mould and Corona. There is no Cymatium, a gutter being obviously out of place, but the Corona is crowned by a fillet and small Cyma Reversa. The Base, which is two-ninths of the height of the Pedestal, or, according to Vignola, only one-ninth, like

the Cap, consists of a Plinth and Base Mouldings, among which a Cyma Recta is generally conspicuous, with a Torus below it.

The mouldings, in both Cap and Base, are fewer and consequently larger and simpler in the Tuscan and Doric Orders than in the Ionic and Corinthian, the Tuscan, according to Vignola, having no Corona, and the Corinthian a Necking and Astragal. The Cap projects less than its own height, in many examples, and the Plinth just as much as the Corona.

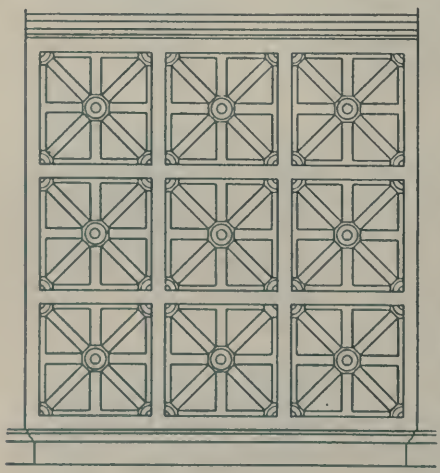


Fig. 137

But Pedestals vary greatly both in their proportions and in their mouldings.

33. Parapets.—A wall low enough to lean upon is called a **Parapet,** and whether low or high is often strengthened by occasional Posts or Pedestals, sometimes of the same height, sometimes higher. In either case the wall or parapet has a Cap and Base, which may or may not be like those of the Pedestals or Posts. A similar strip of wall, with the wall continued above the Cap, is called a *Continuous Pedestal*, Fig. 143. This often occurs between the Pedestals that support Pilasters.

34. Balustrades.—In antiquity, Parapets were often pierced by triangular penetrations, apparently in imitation of wooden fences, Fig. 137. But in modern times the openings in Parapets are generally filled with a sort of colonnade of dwarfed columns called **Balusters.** These frequently occupy the whole space between one Post or Pedestal and the next, forming a **Balustrade,** Fig. 138. If the distance is great, so that the Cap has to be made of several lengths

of stone, a block called an *Uncut Baluster* is placed under the joint. Not more than a dozen Balusters should occur together without such interruption. Against the Pedestal

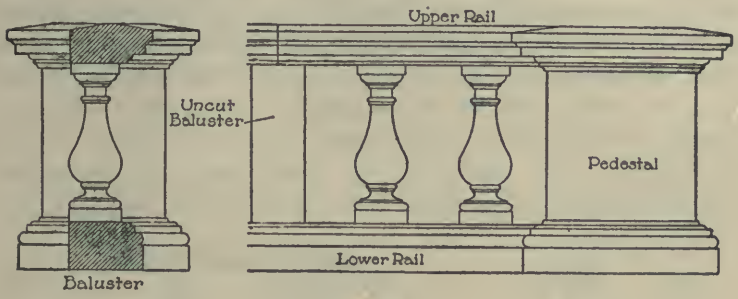


FIG. 138

is often set a *Half-Baluster*, or, which is better, half of an Uncut Baluster, to support the end of the Upper Rail, Fig. 139.

35. The Cap and Base of the Pedestals, or of the Parapet or Continuous Pedestal, are called in a Balustrade the *Upper* and *Lower Rails*. The Baluster supports the Upper Rail as a Column supports an Entablature, and stands upon the Lower Rail as upon a Stylobate, Fig. 139. It has its own Cap, the height of which, including the Astragal, is one-quarter the height of the Baluster, and which consists of a plain Abacus, Echinus, and Fillet and Necking. These three members are of equal height, as in the Tuscan and Doric Capitals.

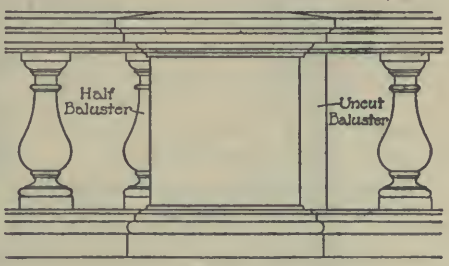


FIG. 139

The Base of the Baluster is also one-quarter its total height and resembles the Attic Base. The Scotia, as in the Greek Attic Base, is generally made the principal member.

Between the Cap and Base is the Shaft, or *Sleeve*, which has the outline of a Quirked Cyma Reversa, the greatest diameter, or *Belly*, coming at about one-fourth of its height,

or one-third the height of the Baluster, Fig. 140. Its width at this point is also one-third the height of the Baluster, as is also that of the Plinth of the Base, exactly, and the width of the Abacus, almost. The Necking is less than half as wide. The point of contrary flexure in the Cyma Reversa is half way between Cap and Base, or between the Upper and Lower Rails. But these proportions are made somewhat lighter for use with the Ionic and Corinthian Orders.

The Rails are sometimes, in height, one-sixth and two-sixths of the space between them, like the Cap and Base of a

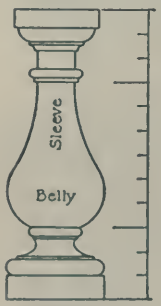


FIG. 140

FIG. 141

FIG. 142

Continuous Pedestal; but they are often made much heavier, even one-third and one-half.

Instead of the Cyma Reversa, a Beak Moulding is often used, Fig. 141, and other variations are frequent. Of these, the most important is the so-called *Double Baluster*, which consists of two small Balusters, set together base to base, Fig. 142. Vignola also used a high block under the Plinth. Balusters are often made square in section, like piers, instead of round, like columns.

Balusters are set about half their height apart, on centers.

A Balustrade, like a Parapet, is intended to lean upon, and should not be more than about 3 or 4 feet high. While, therefore, Columns and Entablatures are proportioned to the size of the buildings in which they occur, varying in height from 10 or 12 feet to 50 or 60, Balustrades, like steps, are proportioned to the size of the human figure, and in large buildings

are relatively much smaller than in small ones. They thus serve, as do steps, and as does the human figure when introduced into a drawing, to indicate the scale of a building.

But in very large buildings balustrades have sometimes been made of colossal dimensions, that on the top of the front of St. Peter's, for example, being about 8 feet high.

ATTICS

36. When a Parapet is placed on top of an Entablature it is called an **Attic**, that is to say, an "Athenian" story,

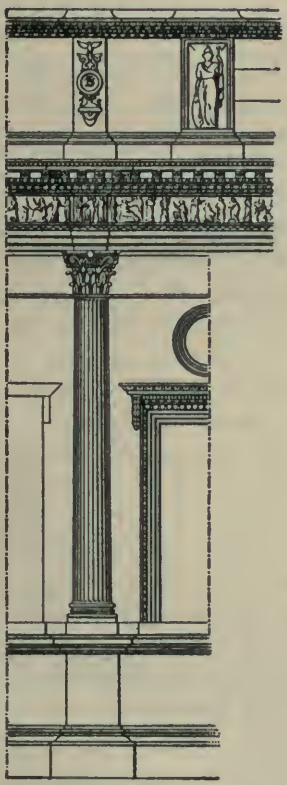


FIG. 143

FIG. 144

Fig. 143. Like Pedestals, Attics vary much in size and in architectural treatment. They are generally made about a

quarter as high as the order below, and should not be more than a third, and they should have a high Plinth, or even a double Plinth, Fig. 144, so as not to be too much hidden by the projection of the Cornices on which they stand.

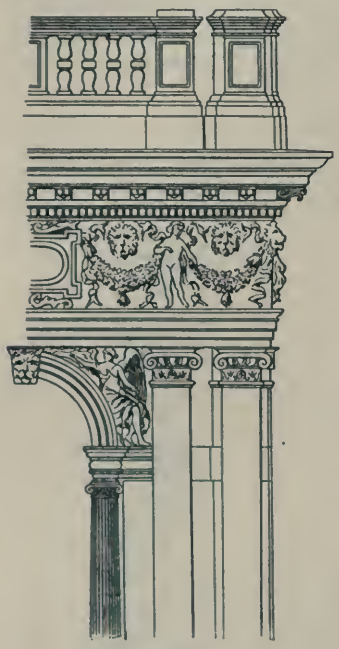


Fig. 145

The place of an Attic is often taken by Balustrades, Fig. 145, which also should have high Plinths, below the lower rail.

PEDIMENTS—PLATE XVII

37. The Gable upon a Classical building is called a **Pediment**, Fig. 146. It consists of a triangular piece of wall, called the *Tympanum*, which is in the same plane as the Frieze below; of a *Horizontal Cornice*, which divides the Tympanum from the Frieze; and of two pieces of inclined cornice that surmount the Tympanum. The inclined, or *Raking, Cornice* is like the cornice that crowns the wall on the sides of the building, but the Cymatium is a little wider. The Horizontal Cornice has no Cymatium, and generally terminates in a Fillet, called the *Split Fillet*, which divides at the angle where the two Cornices come together.

If the Cymatium is a Cavetto, the under side of the Fillet beneath it is beveled, either on the rake or along the wall; if it is an Ovolo, the same thing happens to the Fillet above it, Fig. 147. With the Cyma Reversa both occur, with the Cyma Recta, neither, the fillets having no soffit. This is one of the reasons for employing this moulding in this place.

When a Cyma Recta is used in the Cymatium, it occurs in four different forms, Fig. 148; viz.: (1) the profile of the moulding along the wall; (2) the profile of the raking moulding;

PEDI

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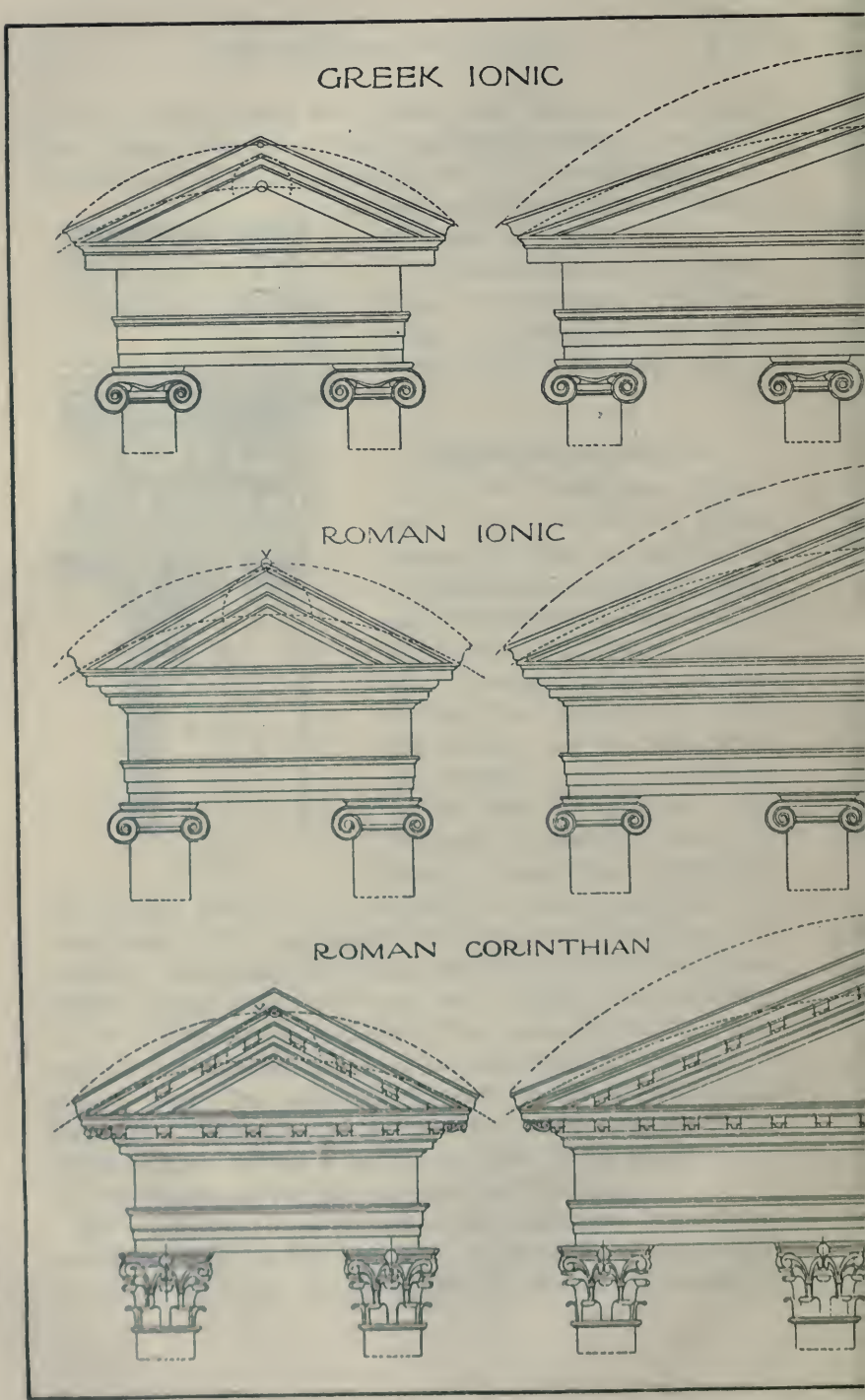
THE AMERICAN VIGNOLA



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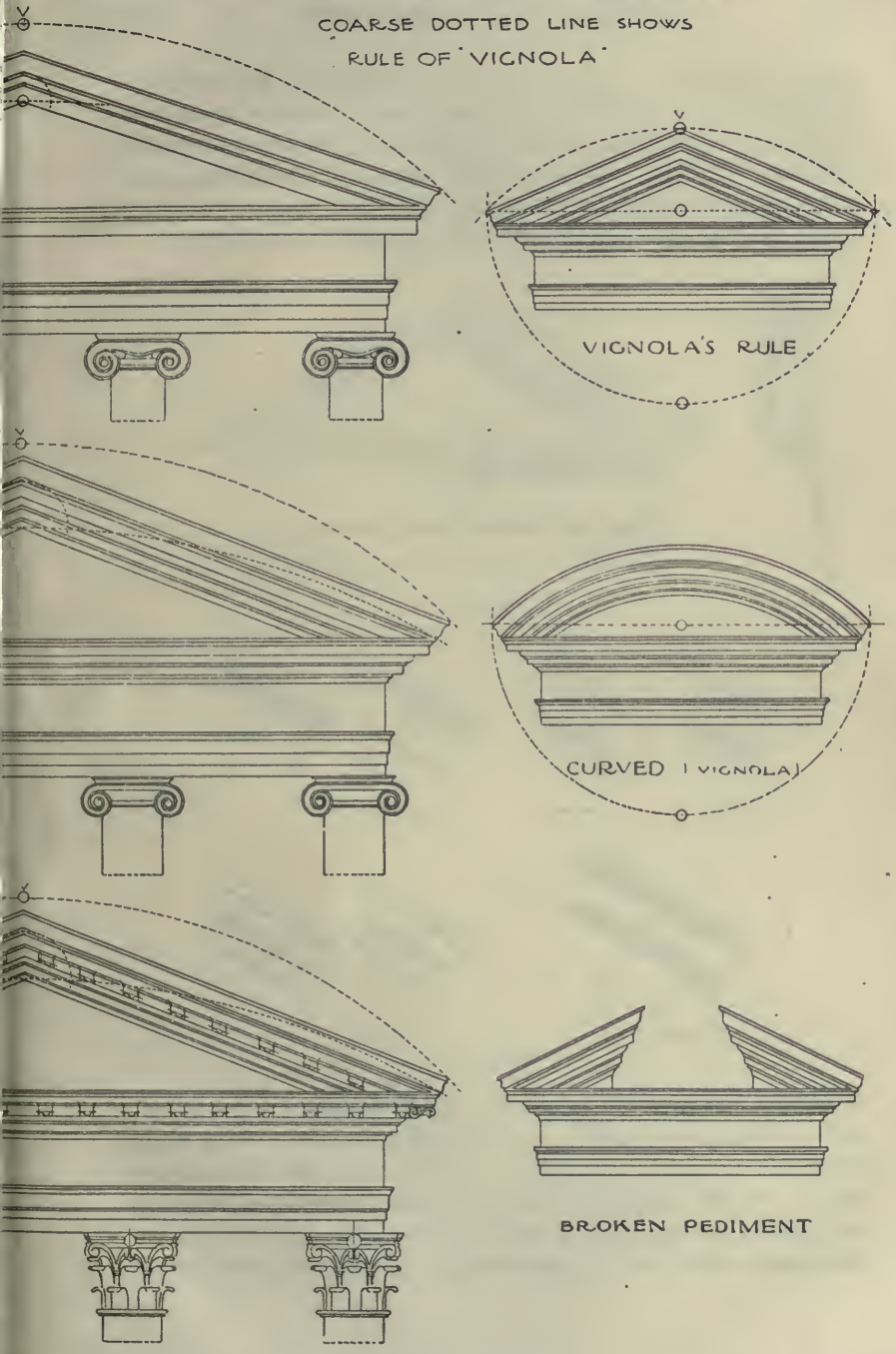

COARSE DOTTED LINE SHOWS
RULE OF VIGNOLA
VIGNOLA'S RULE
CURVED (VIGNOLA)
BROKEN PEDIMENT

(3) the line of intersection of these two mouldings, which lies in a vertical plane, set at 45 degrees; (4) the line of intersection of the two raking mouldings at the top. (1),(2), and (4) have the same projection but different heights; (1) and (3) have the same height but different projections.

According to Vignola, the obtuse angle at the top of the

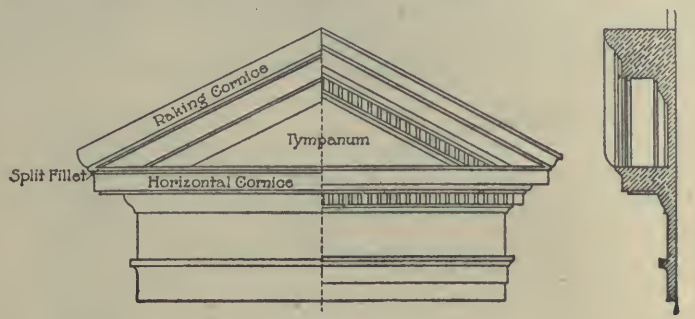


FIG. 146

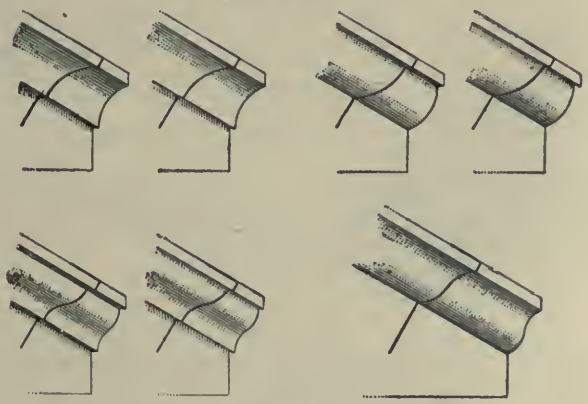


FIG. 147

Pediment is included within an arc of 90 degrees; it accordingly gives a slope of $22\frac{1}{2}$ degrees. This is a good rule for most cases; but if a building is high and narrow, the slope needs to be steeper, and if it is low and wide, flatter. Inasmuch, however, as, for a building of a given width, the higher it is, the larger is the scale of the Order employed

and of all the details of the Order, it follows that, for a given width of front, the larger the mouldings are, the steeper must be the slope.

Upon this is founded the following rule for the slope of Pediments, devised by Stanislas L'Eveillé, Fig. 149: Taking the upper line of the Horizontal Cornice as one side, construct below it an equilateral triangle, and taking the vertex of this triangle as a center, and its sides as a radius, describe an arc of 60 degrees. Taking, then, the summit of this arc

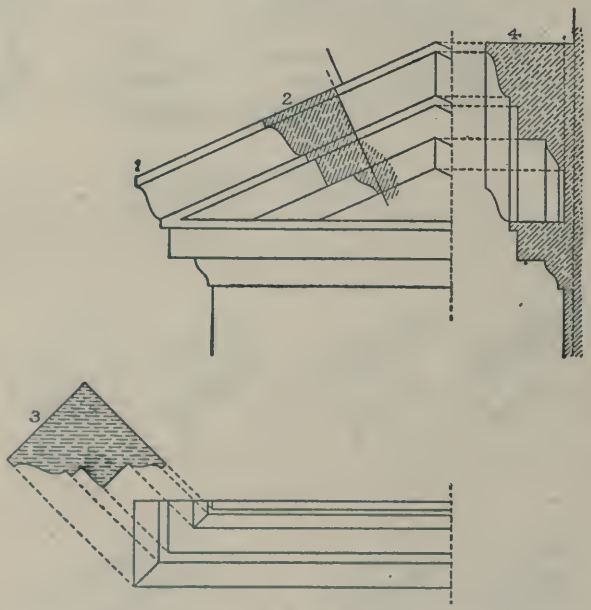


Fig. 148

as a center, describe a circle, the radius of which is equal to the width of the horizontal cornice. Lines drawn from the extremities of the Corona tangent to this circle will give the upper line of the Raking Corona. It is obvious that the larger the cornice, relatively to the length of the front, the steeper will be the slope. It is also plain that this rule gives steeper Pediments for the Corinthian and Ionic Orders than for the Doric and Tuscan, and for the Roman Orders than for the Greek, the cornices being wider.

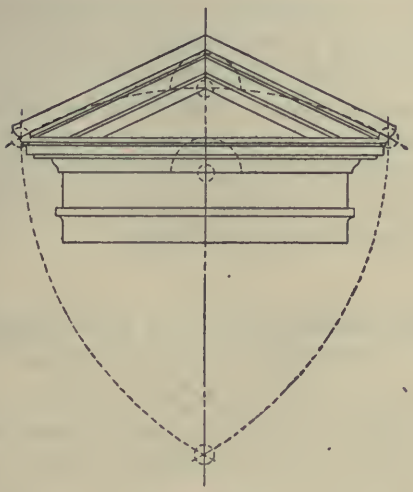


FIG. 149

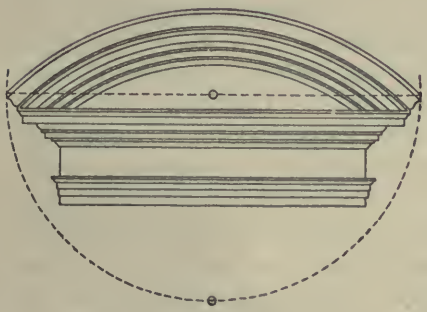


FIG. 150

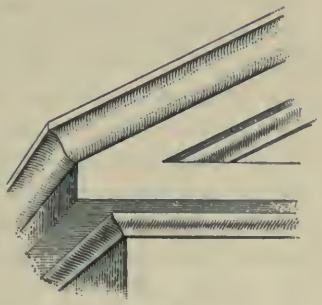


FIG. 151

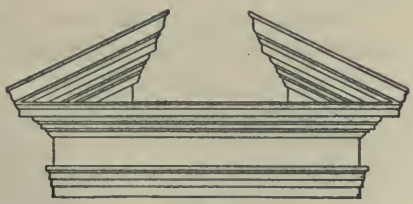


FIG. 152

Circular, or *Curved*, *Pediments* have a sweep of 90 degrees, Fig. 150, starting at an angle of 45 degrees.

When pediments are used merely for ornament the upper part is sometimes omitted, giving a *Broken Pediment*, Fig. 152.

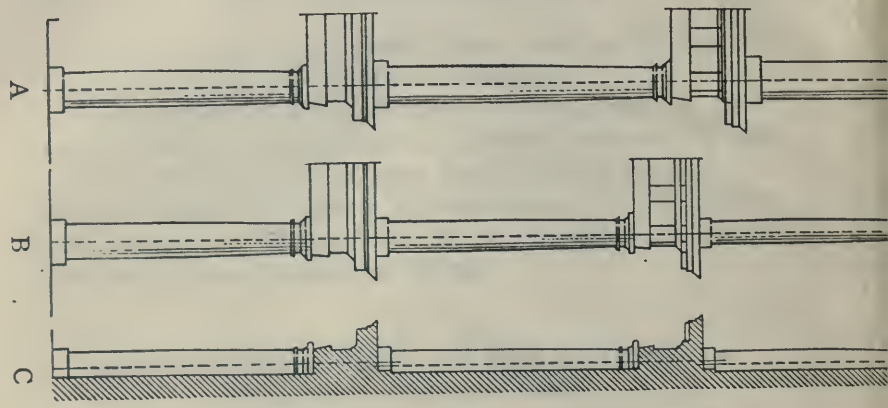
If the moulding that crowns the Corona is omitted, the faces of the three Coronas are continuous, Fig. 151. This was exemplified in antiquity by the recently discovered Treasury of the Cnidians at Delphi.

INTERCOLUMNIATION, OR THE SPACING OF COLUMNS—PLATE XVIII

38. The space between the two columns, measured just above their bases, is called an **Intercolumniation.** It is one Diameter less than their distance apart on centers, or on edges.

Columns are said to be *Coupled*, or to have a *Pycnostyle*, *Systyle*, *Diastyle*, or *Areostyle Intercolumniation*, according as they are set close together, or are one, two, three, or four Diameters apart, as nearly as may be; i. e., about one, two, three, four, or five Diameters on centers. The Systle and Diastyle are the most usual, with an Intercolumniation of two or three Diameters. But Coupled Columns cannot be nearer than one and one-third Diameters, on centers, instead of one Diameter, on account of the projection of their bases, and in the Ionic, Corinthian, and Composite Orders, not nearer than one and one-half Diameters, on account of the projection of their Capitals. The Intercolumniation of Coupled Columns is accordingly one-third or one-half of a Diameter, or even a little more, to prevent the Bases or Caps from actually touching.

So also the Pycnostyle Intercolumniation is made one and one-fourth Diameters, instead of one Diameter (i. e., two and one-fourth Diameters o. c., instead of two), to avoid crowding. The ancients thought that even the Systyle columns, with an Intercolumniation of two Diameters, came too near together, and preferred what they called the *Eustyle Intercolumniation*, of two and one-half Diameters (or three and



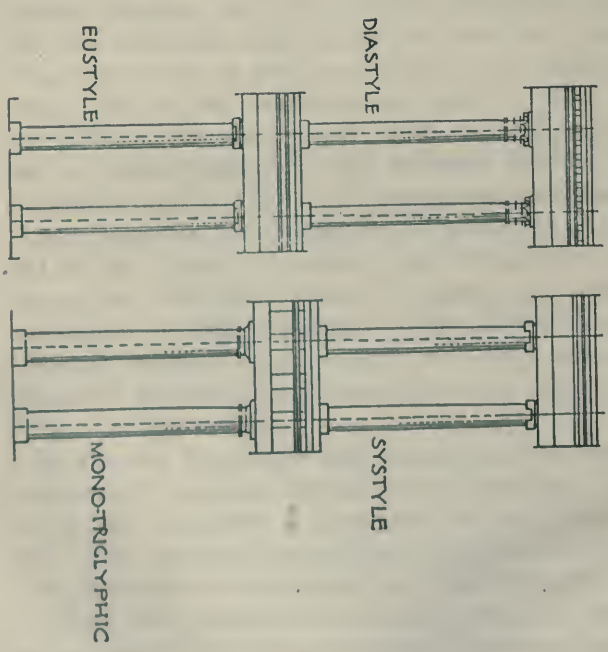


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PLATE

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SUPERPOSITION AND INTERCOLUMNIATION

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one-half Diameters o. c. in place of three Diameters). But the moderns prefer to make the Eustyle Intercolumniation two and one-third Diameters (setting the columns three and one-third Diameters o. c.), as this brings every Column in Ionic and Corinthian colonnades exactly under a Dentil, and every alternate one just under a Modillion, the Dentils being

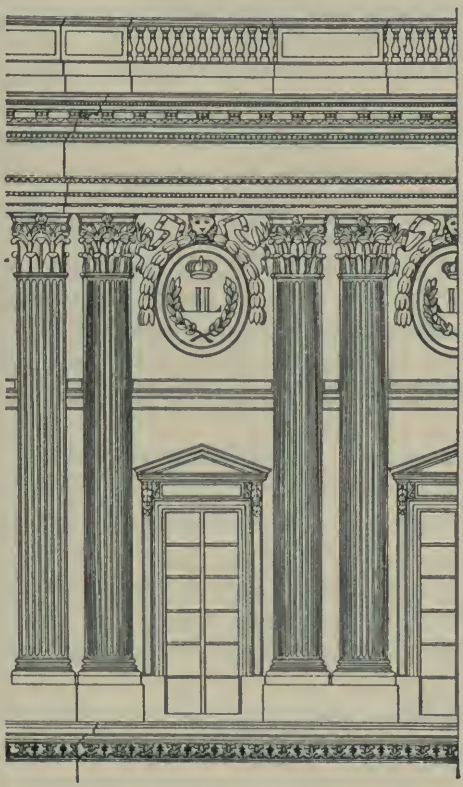


Fig. 153

one-sixth of a Diameter o. c. and the Modillions two-thirds of a Diameter.

The wider Intercolumniations are preferable, obviously, when the columns are small, since otherwise it might be difficult to get between them, and the Systyle, or even the Pycnostyle, when the columns are very large, since otherwise

it might be difficult to find stone architraves long enough to span the interval. But the ancients used Tuscan Columns chiefly with wooden architraves, setting them as much as seven Diameters apart, which is called *Tuscan Intercolumniation*, and which makes the space between the columns about square. In modern times, also, an arrangement of coupled columns has been employed, called *Areosystyle*, the columns being set half a Diameter apart, and the space between the pairs of columns made three and one-half Diameters. This is greater than the Diastyle Intercolumniation and less than the Areostyle by half a Diameter. From the axis of one pair of columns to that of the next pair the distance is six Diameters. If in a Systyle Colonnade, with the columns three Diameters on centers, the alternate columns are moved along till they nearly touch the intervening ones, the result is an Areosystyle Colonnade. This was first used by Perrault in the Eastern Colonnade of the Louvre, Fig. 153.

In actual practice these rules for Intercolumniation are seldom exactly followed.

DORIC INTERCOLUMNIATIONS

39. In the Doric Order, since the Columns come exactly under the Triglyphs and the Triglyphs are one and one-fourth Diameters o. c., as on edges (the width of the Triglyph being one-half of a Diameter and that of the Metopes three-fourths of a Diameter), the distance of the Columns on centers must needs be a multiple of one and one-fourth Diameters.

This makes the coupling of Doric Columns difficult, since, even if the Bases touch, the distance between axes is still one and one-third Diameters, which is more than that of the Triglyphs by one-twelfth of a Diameter. This slight discrepancy can, however, be got over by making each Base a trifle narrower, or the Triglyphs and Metopes a trifle wider, or by putting the Columns not exactly under the Triglyphs, or by employing all these devices at once.

If the Columns are set under alternate Triglyphs so that there is one Triglyph over the intervening space, their

distance apart o. c. is two and one-half Diameters. The Intercolumniation is then one and one-half Diameters, and is said to be *Monotriglyph*. This is the most common arrangement. But if the scale is small, it is usual, at least at the principal entrance of a building, to have two Triglyphs over the opening, the Columns being three and three-fourths Diameters on centers. The Intercolumniation is then two and three-fourths Diameters, and is called *Ditriglyph*. Still wider spacing is employed when the Architraves are of wood.

When two, four, six, eight, ten, or twelve Columns are used in a Colonnade or Portico, it is said to be *Distyle*, *Tetrastyle*, *Hexastyle*, *Octastyle*, *Decastyle*, or *Dodecastyle*, according to the Greek numerals. Examples are found at Argos, Assos, Thoricus, and Pæstum of façades with an odd number of columns, three, five, seven, and nine, a column instead of an intercolumniation coming on the axis, giving *tristyle*, *pentastyle*, *heptastyle*, and *enneastyle* porticos. But in all these cases the entrances were apparently on the sides of the buildings, where there was an even number of columns.

SUPERPOSITION—PLATE XVIII

40. Superposition is the placing of one Order above another, as in the Roman Amphitheaters and in many modern buildings of several stories. The more solid forms of the Tuscan and Doric are naturally placed below, and the Ionic and Corinthian above. The Composite is sometimes placed below the Corinthian, as being more vigorous. But in high buildings it is generally placed on the top story, its large details being better seen at a distance than are those of the more delicate Order.

Even when the same Order is employed in the different stories it is advisable to have the upper Columns of smaller diameter than those below, and all the dimensions diminished accordingly, for the sake of lightness. But it is still more so when different Orders are superposed, for otherwise the Doric and Corinthian stories would overpower the Tuscan and Ionic ones beneath. It is usual, accordingly, to make

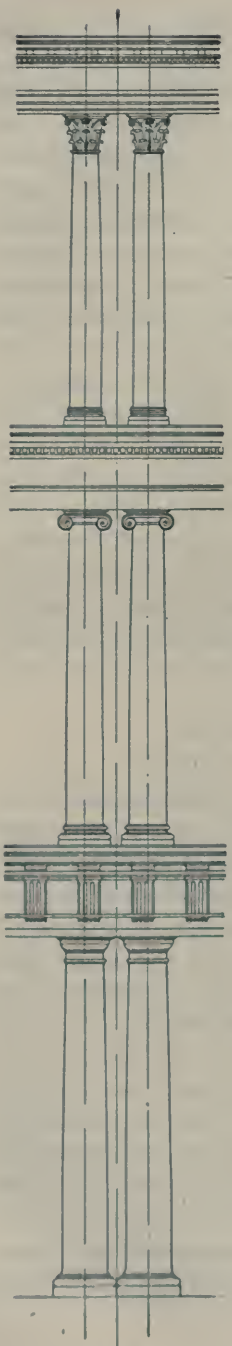


Fig. 154

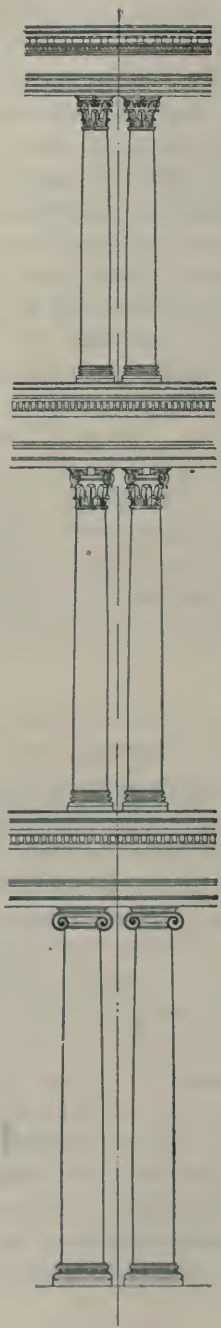


Fig. 155

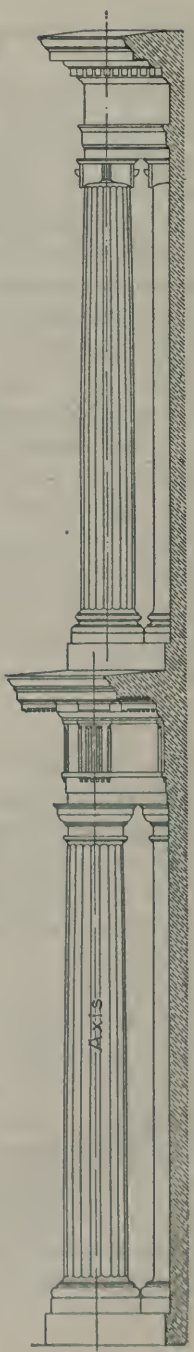
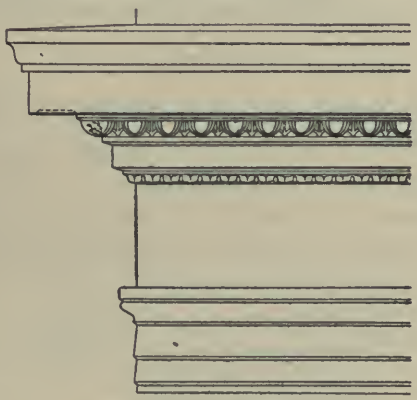


Fig. 156

the lower diameter of each Shaft equal to the upper diameter of the Shaft below it, as if they were all cut from a single piece of tapering stone. This makes the scale employed in the second story five-sixths of that used in the first; in the third, twenty-five thirty-sixths, or about two-thirds; in the fourth, about three-fifths, and in the fifth about one-half, if the Five Orders are employed in regular sequence; this makes the relative height of the Orders in the successive stories to be as 7, $6\frac{2}{3}$, $6\frac{1}{4}$, $5\frac{5}{6}$, and 5, very nearly. The actual height of the stories themselves may be somewhat modified by the use of plinths and pedestals.



From the Pantheon, Rome

FIG. 157

This system of Superposition makes the distance apart of the Columns in each story, when expressed in terms of their own Diameter, six-fifths of that in the story below. A Eustyle Intercolumniation in one story thus exactly produces a Diastyle Intercolumniation in the story above, and a Doric Monotriglyph Intercolumniation, a Systyle.

$$(\tfrac{6}{5} \times 3\tfrac{1}{3} = 4;\ \tfrac{6}{5} \times 2\tfrac{1}{2} = 3)$$

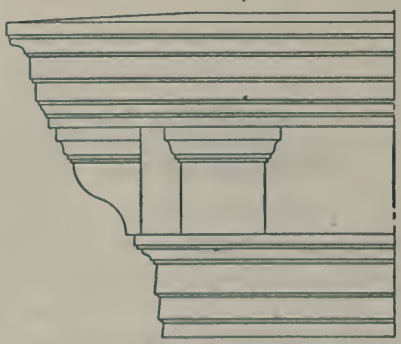
Coupled Columns set one and one-third Diameters apart, on centers, in one story, are, in the story above, one and three-fifths Diameters o. c., and in the third story nearly two Diameters o. c. This does very well for a sequence of Doric, Ionic, and Corinthian, Fig. 154. But if the lower Columns

are Ionic or Corinthian those above had better be set nearer together, the axis of the Intercolumniation only being preserved, Fig. 155.

With this exception, Superposed Columns are set so that their axes are in the same vertical line, when seen in elevation. But in profile, as seen in section, the upper ones are set back, the wall against which they stand generally growing thinner as it goes up, Fig. 156. Since the Columns themselves also grow smaller, it would not do to leave too much space behind them. The slightly pyramidal effect that this gives to a building of several stories is of value, preventing it from looking top-heavy and high-shouldered.

OTHER CORNICES AND STRING-COURSES

41. The Five Orders worked out by Vignola are generally accepted as a standard, though they are seldom exactly followed in practice, modern as well as ancient



From the Fourth Order of the Coliseum

FIG. 158

examples exhibiting a great variety in the forms and proportions of the parts. But familiarity with them is of great service in designing, since they can safely be employed on all ordinary occasions, and in the earlier stages of architectural composition. Other types of nearly equal merit have been published by Alberti, Palladio, Serlio, Scamozzi, Sir

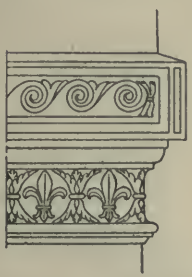
William Chambers, and others, and a great variety of cornices, both with and without friezes and architraves, have been employed in ancient and modern times to crown and

From the Villa Caprarola, by Vignola

FIG. 159

protect walls that were not decorated with columns or pilasters.

Many of these show Blocks or Modillions without any Dentil Course below, as on Palladio's Composite Cornice, and in many of them the Dentil Course is plain, forming



From the Farnese Palace By SanGallo

FIG. 160

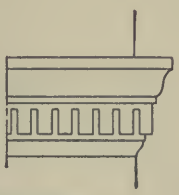
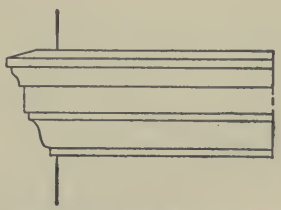


FIG. 161



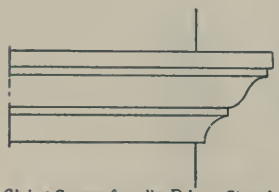
String-Course from the Strozzi Palace

FIG. 162

what is called an *Uncut Dentil Course*, Fig. 157. In others, the brackets that support the Corona are brought down so as to occupy the Frieze, Fig. 158. The most important of

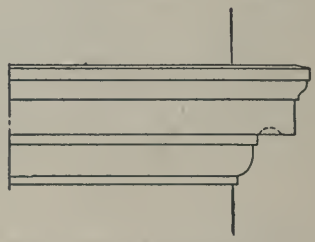
these is Vignola's so-called *Cantilever Cornice* used by him at Caprarola, Fig. 159. It seems to have been suggested by the Mutules and Triglyphs of his Mutulary Doric.

Cornices, and indeed full Entablatures, are often used as String-Courses to separate stories, as in the Roman Amphitheaters. But it is customary to use, instead, a lighter



String-Course from the Palazzo Giraud
By Bramante

FIG. 163



String-Course from the Sachetti Palace
By San Gallo

FIG. 164

form, of small projection, somewhat like the cap of a pedestal, in which the Cymatium and Bed Mould are often omitted, and the Corona itself sometimes diminished to a mere fillet, Figs. 160 to 162.

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